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ANNOTATED LIST OF THE BIRDS OF LEYTE ISLAND, PHILIPPINES

by

Kenneth C. Parkes

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ANNOTATED LIST OF THE BIRDS OF LEYTE ISLAND, PHILIPPINES

*Kenneth C. Parkes**

INTRODUCTION

Until relatively recently, the Philippine island of Leyte was, ornithologically speaking, perhaps the least known major island of the archipelago. Few large collections of birds had been made on the island, and those in the National Museum of the Philippines had been destroyed during the battle for Manila in 1945. Through the kindness of Dr. Douglas A. James of the University of Arkansas, Carnegie Museum acquired by exchange in 1959, with the consent of the collector, a small collection of Leyte birds assembled in 1945 by Mr. T. H. Holder while in military service. Just as I was preparing to study this collection, which contained several new records for the island, the American Museum of Natural History received a large shipment of Leyte birds collected in 1961 by G. Alcasid and M. Celestino. I was invited by Dr. Dean Amadon to study this important collection, half of which was to be returned to the National Museum of the Philippines, cosponsor of the expedition. As no attempt had been made for many years to write a complete list of the birds known from Leyte, I extended my study to include all available specimens and published records from the island. Revisionary work was often necessary to verify the taxonomic status of Leyte forms.

Acknowledgments

My study of the avifauna of Leyte has been only a part of broader taxonomic and distributional studies of Philippine birds. It is impossible to separate out those institutions at which specimens were studied or from which specimens were borrowed specifically for the Leyte project. The reader is therefore referred to a recent paper (Parkes, 1971c) in this series, in which I listed *all* institutions whose collections I have utilized in working on Philippine birds. I am especially indebted to Dean Amadon, who first suggested that I write a list of Leyte birds and turned the AMNH material over to me for study; to S. Dillon Ripley, who permitted

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*Curator of Birds
Carnegie Museum

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me to study Leyte material at the USNM that he had originally intended to report on himself; to Emmet R. Blake and Melvin A. Traylor for access to a large unstudied Leyte collection at the FMNH; and to John E. duPont, who has been helpful in many ways in readying this study for publication. I am indebted to T. H. Holder and Douglas A. James for arranging transfer of Mr. Holder's Leyte collection to Carnegie Museum. Among the other individuals who have been especially helpful during the course of this study are I. C. J. Galbraith, Derek Goodwin, Mary LeCroy, D. S. Rabor, Austin L. Rand, Neal G. Smith, the late L. L. Snyder, and Richard L. Zusi. A grant from the Frank M. Chapman Memorial Fund of the AMNH covered my expenses for several trips to New York, and trips to Chicago and Washington were made possible through a gift from John E. duPont.

Abbreviations

Institutions for which abbreviations are used in this paper are as follows:

AMNH	American Museum of Natural History
ANSP	Academy of Natural Sciences of Philadelphia
BMNH	British Museum (Natural History)
CM	Carnegie Museum
CU	Cornell University
DMNH	Delaware Museum of Natural History
FMNH	Field Museum of Natural History
LSU	Museum of Zoology, Louisiana State University
MAPS	Migratory Animal Pathological Survey
PNM	Philippine National Museum
UMMZ	Museum of Zoology, University of Michigan
USNM	United States National Museum of Natural History
YPM	Peabody Museum of Natural History, Yale University

ZOOGEOGRAPHY OF LEYTE

The island of Leyte, eighth largest in the archipelago, lies in the eastern part of the Visayan group in the central Philippine Islands. Its extreme dimensions are 121 miles from northwest to southeast and 52 miles from northeast to southwest, with a total area (exclusive of satellite islands) of 3872 square miles. Its terrain is rugged and mountainous, with several distinct cordilleras running approximately parallel to the NW-SE axis of the island. The only extensive lowland area is the Leyte Valley in the northeastern part of the island, once a shallow extension of Leyte Gulf. Additional descriptions of Leyte can be found in Bureau of Insular Affairs (1902:590–597) and Wernstedt and Spencer (1967:454–468).

The avifaunal relationships of Leyte lie with the adjacent major island of Samar to the northeast and, to a slightly lesser extent, with Bohol to the southwest. McGregor (1920) reviewed earlier analyses of avifaunal relationships within the Philippines and confirmed the distinctiveness of the Samar-Leyte-Bohol group. Using the most recent list of Philippine birds (duPont, 1971) as a guide, we see that 19 subspecies are found on Samar, Leyte, and Bohol but not elsewhere (except for satellite islands):

Loriculus philippensis worcesteri
*Centropus melanops banken**
Harpactes ardens linae
Ceyx argentatus flumenicola
Penelopides panini samarensis
Buceros hydrocorax semigaleatus
Dryocopus javensis pectoralis
Dendrocopos maculatus leytensis
Chrysocolaptes lucidus rufopunctatus
Eurylaimus steerii samarensis
Pitta steerii coelestis
Coracina striata boholensis
Coracina morio ripleyi
Dicrurus hottentottus samarensis
Pycnonotus urostictus atricaudatus
Irena cyanogaster ellae†
Orthotomus nigriceps samarensis
Prionochilus olivaceus samarensis
Zosterops everetti boholensis

Eight species have an endemic Samar/Leyte subspecies but, according to the list published by Rand and Rabor (1960), have not yet been collected on Bohol:

Gallicolumba criniger‡ *leytensis*
Ceyx melanurus samarensis
Megalaima haemacephala celestinoi
Pericrocotus flammeus leytensis
Sitta frontalis lilacea
Stachyris plateni pygmaea
Ficedula basilanica samarensis
Arachnothera clarae philippinensis

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* Not recognized by duPont, but see Parkes, 1971c:13–14.

† Bohol record of Rand and Rabor (1960) overlooked by duPont.

‡ *luzonica* of duPont; see Parkes, 1962b:2–3.

The somewhat more distant position of Bohol is reflected not only in the preceding list (some species of which will probably eventually be found on Bohol), but in the moderate degree of endemism on Bohol itself. Two species have an endemic Samar/Leyte race and an endemic Bohol race:

Samar/Leyte	Bohol
Ptilocichla mindanensis minuta	*P. m. fortichi*
Stachyris capitalis nigrocapitata	*S. c. boholensis*

In three additional species, the Bohol race differs from that on Samar and Leyte, but the latter extends south into Mindanao:

Samar/Leyte/Mindanao	Bohol
Rhinomyias ruficauda samarensis	*R. r. boholensis*
Pachycephala philippinensis apoensis	*P. p. boholensis*
Aethopyga pulcherrima pulcherrima	*A. p. decorosa*

Endemism on Samar and Leyte as individual islands is almost negligible, as might be expected in view of their proximity. Only one species has an endemic Samar subspecies and no representative on Leyte: *Dicaeum ignipectus bonga.* A juvenile from Leyte was attributed to this species by Meyer de Schauensee and duPont (1962:169), but the specimen (which I have examined) is actually *Dicaeum pygmaeum.* Conversely, only one species has an endemic Leyte subspecies and no representative on Samar: *Micromacronus leytensis leytensis.* Only two species are represented by separate Samar and Leyte endemic subspecies (with additional subspecies on other islands, but absent from Bohol):

Samar	Leyte
Bolbopsittacus lunulatus callainipictus	*B. l. intermedius*
Rhabdornis inornatus inornatus	*R. i.* new subspecies (described beyond)

Although the island of Cebu lies close to both Bohol and Leyte, its avifauna is quite distinct (McGregor, 1920). In only one species does the Leyte population resemble that of Cebu more closely than that of Samar, namely *Megalurus timoriensis,* in which specimens from Cebu, Bohol, and Leyte are assignable to the subspecies *alopex,* whereas Samar specimens represent intermediates between *alopex* and *tweeddalei* of Luzon to the north (Parkes, 1970).

By modern taxonomic standards, no full species of bird is endemic to the island of Leyte. At the time of its description by Amadon (1962a), *Micromacronus leytensis* was thought to be both a genus and species endemic to Leyte, but this status was revised by the discovery on Mindanao of *M. l. sordidus* Ripley and Rabor (1968).

That additional species will undoubtedly be found on Leyte is indicated by the fact that no less than 14 of the land or freshwater Philippine resident species whose ranges are characterized by duPont (1971) as "throughout the Philippines" have not yet been recorded from Leyte. This is even more true of migrants; such widely distributed migrant species as *Accipiter gularis, Motacilla flava,* and *Erithacus calliope* have not yet been taken on Leyte. This is largely a function of the fact that the largest collections of Leyte birds have been made during the (northern) summer months.

Zoogeographic analyses of the avifaunas of Samar and Bohol, now somewhat obsolete because of subsequent work, were published by Rand and Rabor (1960). The format of the present paper is adapted from theirs.

HISTORY OF LEYTE ORNITHOLOGY

The ornithological history of the Philippines presented by Hachisuka (1931) does not mention Leyte as part of the itinerary of any collector prior to 1877. In that year the well-known collector A. H. Everett obtained specimens of 68 species in the vicinity of Amparo, in the southwesternmost part of the island. These were listed by Tweeddale (1878) and are now (except for specimens removed by exchange) in the BMNH.

The next collection of Leyte birds was made by the Steere Expedition, which visited the island in April 1888. The species collected are listed by Steere (1890), but neither the localities visited nor the number collected of each species is mentioned. It is obvious that the habitats visited by Everett and Steere were quite different. The Steere Expedition collected only 48 species in Leyte, but 27 of these had not been taken by Everett. On the other hand, Everett's collection, having been made on or near the coast in late summer and fall, contained an excellent representation of waders and other water birds, virtually absent in the Steere collection. The specimens taken by the Steere Expedition were said by Hachisuka (1931:28) to be "kept in Michigan and Chicago respectively," but they have in fact been widely scattered; nearly 300, for example, including some of the Leyte skins, are housed in the Denver (Colorado) Museum of Natural History. Most of the types are in the BMNH.

Between the years 1887 and 1896, some of the most important collections of Philippine birds were made by John Whitehead. The last island on which he worked was Leyte, which he reached on July 27, 1896. He remained for about three weeks, camping at an elevation of about 1000 feet at the foot of the mountains somewhere in the northwestern part of the island; his collecting locality is nowhere stated but is shown approximately on his map (Whitehead, 1899:83). He was frustrated in his attempts to reach higher elevations by the poor condition of roads and trails. Although Whitehead, who died at 38 of a fever during an expedition to Hainan in 1899, was an excellent field naturalist for his time, the contemporary professional collector's desire for "perfect" specimens is illustrated by his remark about *Irena cyanogaster* on Leyte (Whitehead, 1899:216): "... unfortunately during the time of our visit all birds were in full moult and quite useless." Whitehead's Samar and Leyte collections were reported in a paper by Ogilvie-Grant (1897), and Leyte notes are also included in the collector's own general paper on his Philippine expeditions (Whitehead, 1899). The wording is sometimes ambiguous in these reports, but the total number of species collected appears to have been 58, with six additional species mentioned of which no specimens were preserved. Most of Whitehead's birds went to the Rothschild Collection, now at the AMNH.

The next collector to visit Leyte was Dr. Paul Bartsch of the Smithsonian Institution. The U. S. Bureau of Fisheries steamer *Albatross* called at Tacloban on April 11, 1908 and at Port Dupon (near the present town of Isabel) on May 7, 1908. Ten specimens (representing nine species) were collected by Bartsch and are now in the USNM. His specimen of *Elanus caeruleus* remains the only one known from Leyte. A list of all the birds collected on this expedition of the *Albatross* was published by Mearns (1909b).

McGregor (1909) listed every island from which every form (all listed as full species) had been collected in the Philippines, together with the names of the collectors. Insofar as Leyte is concerned, he overlooked three species collected by Everett (*Actitis hypoleucos, Nectarinia sperata, Corvus macrorhynchos*), three collected by Steere (*Lanius cristatus, Pycnonotus goiavier, Prionochilus olivaceus*), and one collected by Whitehead (*Ducula aenea*). The first part of McGregor's "Manual" appeared prior to the paper by Mearns (1909b), but the second part includes the Bartsch records; those referring to species covered by the first part are given in an addendum.

Hachisuka (1931:48) mentions Leyte as one of the islands represented in a collection made in 1909 and 1910 by J. J. Mounsey, then in the Fleming collection, now in the Royal Ontario Museum, Toronto. As I have already shown (Parkes, 1965a), the alleged Leyte specimens were actually from the small island of Buad, which is faunally part of Samar.

There is a long hiatus in the history of Leyte ornithology after the *Albatross* expedition. In 1932 some birds were collected at Palo for parasitological studies at the Philippine Bureau of Science, Manila. No list of these was published *per se*, but five species from Palo are mentioned as hosts of tapeworms by Tubangui and Masilungan (1937). One of these (*Butastur indicus*) had not previously been collected on Leyte. In the species accounts that follow, these are credited to Celestino, the collector.

The last collection from Leyte prior to World War II was made in May 1937 by D. S. Rabor. He was based at Helosig Barrio (shown as Hilosig on some maps), about midway between Baybay on the west coast and Abuyog on the east coast. Collections were made at various localities along the road connecting these two towns, at altitudes between 750 and 1250 meters. In all, 257 specimens of 77 forms were taken, and eight additional species were seen but not collected. Of these, 17 of the collected species and three of the sight records were said by Rabor (1938) in his report on this expedition to be first records for Leyte. One of these was listed in error, as Rabor overlooked Everett's record of *Actitis hypoleucos* (Tweeddale, 1878:345). Rabor's collection was deposited in the Philippine Bureau of Science (later the National Museum of the Philippines), which was destroyed in the battle for Manila in 1945. Several species have not been collected on Leyte except by Rabor in 1937 (*Pernis apivorus, Cuculus sparverioides, Cuculus canorus, Eurostopodus macrotis*), so the loss of his collection means that no Leyte specimens now exist of these species. Records from this expedition are listed in the species accounts as "Rabor 1937" to distinguish them from those made by the same collector in 1964; "Rabor (1938)" refers to the *published* account of the expedition.

A number of American servicemen observed or collected birds on Leyte just after the end of World War II. Lint and Stott (1948) published notes on their observations that modified or supplemented information in Delacour and Mayr (1946). Information is given on nine Leyte species. Six specimens collected from September–December 1945 by the late Stephen T. Bivins are now in the collection of Cornell University. Mr. T. H. Holder donated a collection of 38 skins taken in Leyte to his alma mater, the University of Arkansas. These were exchanged to Carnegie Museum, and Mr. Holder also gave the latter institution an additional 32 Leyte specimens. A few of these have been subsequently exchanged to other institutions, as noted in the species accounts that follow.

I know of a few additional Leyte specimens collected by servicemen: two collected by Richard P. Grossenheider in the AMNH and one collected by Kenneth W. Prescott in the UMMZ. Although I have visited most of the major and several of the smaller museum collections in North America, and believe that I have recorded all Leyte specimens in these institutions, and have received negative reports on the presence of Leyte material through correspondence with several curators, it is more than likely that additional specimens from Leyte found their way into small collections after World War II. I would appreciate being informed of any such material.

In 1961 the first large postwar collection, perhaps the most important ever taken on Leyte, was made by G. L. Alcasid and M. Celestino of the National Museum of the Philippines. The chief collecting locality was

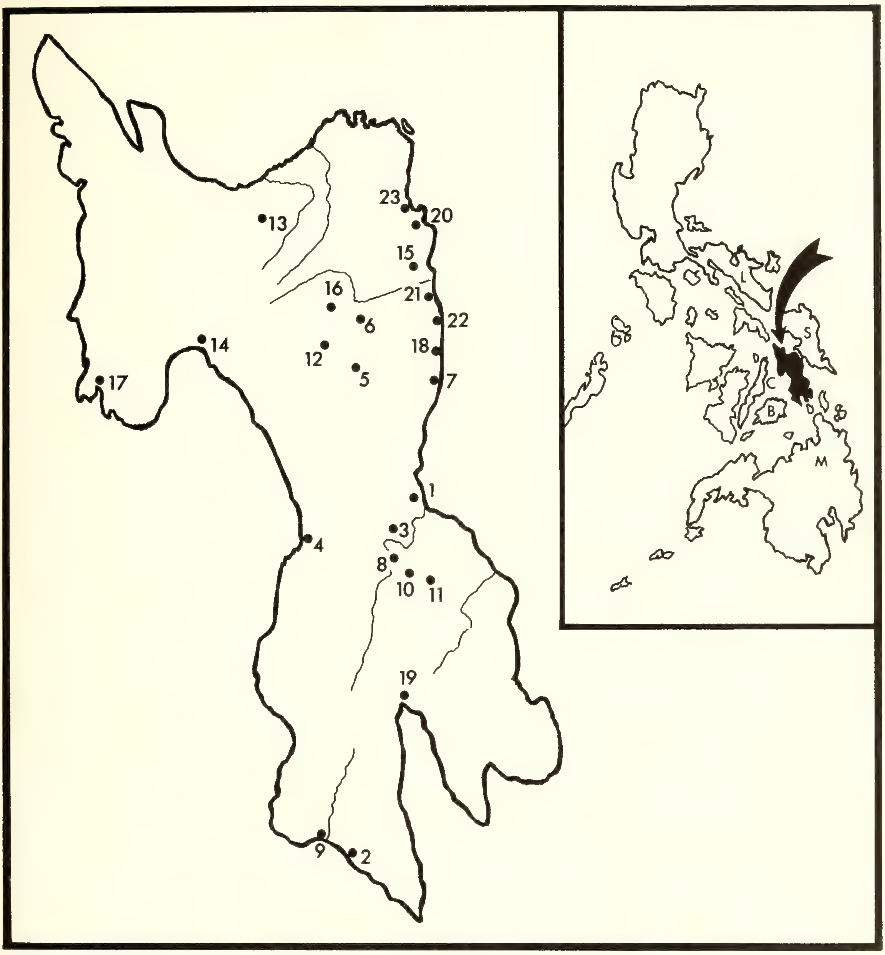
Barrio Patok, Dagami, in the Mount Lobi area. This area was described by Alcasid (letter to Amadon of November 7, 1961) as follows:

> The immediate vicinity of Patok is cultivated, mostly planted to abaca and coconuts. But, in the vicinity of the 1,000 foot level the forests still persist, but broken in many places by clearings made after the loggers are through getting the large trees. Actually logging is going on in the deeper forest region to an elevation of about 2,000 feet. Most of our collecting was done in this area although we made sorties to reach the summit [= 4,426 feet]. Our camp and main collecting ground is about five miles from Patok on the NE shoulder of Mt. Lobi at about 1,200 feet. The clearings are just newly cut with stumps and fallen trees waiting to be burned at the height of the dry season, in this case September.

The other locality represented in the Alcasid-Celestino collection is Balinsasayao (see map). Although no water birds whatsoever are included in this collection, no less than 82 species are represented, of which 12 were new to Leyte. Among these was the startling new genus of babblers *Micromacronus*. After my studies of this collection were completed in New York, half of the specimens were returned to Manila. For the sake of brevity in the text that follows, the year (1961) is usually omitted in citing the dates of Alcasid-Celestino specimens.

In July and August 1961, collections were made for the DMNH on five islands of the Philippines. The collector on Leyte was Onofre M. Caliwag, and the localities visited are given as Mount Lobi, nearby Dagami village, and Abuyog, on the east coast. A list of the species collected was published by Meyer de Schauensee and duPont (1962). These authors stated that 14 of the 62 species listed were new to Leyte. Three of these are also represented in the contemporaneous Alcasid-Celestino collection. Eight others had already been reported in the literature from Leyte, but these records were overlooked by Meyer de Schauensee and duPont. One species was misidentified; as mentioned before, the alleged first Leyte specimen of *Dicaeum ignipectus* is actually *D. pygmaeum*, which was already known from Leyte. Of two species, Caliwag's specimens are the first and only Leyte records to date: *Amaurornis phoenicurus* and *Treron vernans*. Most of the Caliwag collection is in the DMNH, but some specimens were donated by John E. duPont to the ANSP.

In May–July 1964, D. S. Rabor and associates made a large collection on Leyte. Of the 110 species represented in this collection, seven were new to Leyte. However, all except two of these were migrants; Rabor's expedition began its field work early enough in May so that numbers of northern migrants were still present, whereas most Leyte collections have been made during the summer. The two nonmigrant species new to Leyte collected by Rabor are the introduced *Passer montanus* and the widely distributed *Collocalia esculenta*. Of more interest is the fact that four of



Leyte Island: Principal localities mentioned in text. 1, Abuyog. 2, Amparo. 3, Balinsasayao. 4, Baybay. 5, Burauen (including San Pablo). 6, Dagami. 7, Dulag. 8, Helosig. 9, Maasin. 10, Mahaplag. 11, Mount Kabalanti-an (approximate). 12, Mount Lobi (approximate). 13, "North Leyte" (Whitehead; approximate). 14, Ormoc City. 15, Palo. 16, Patok. 17, Port Dupon (Isabel). 18, San Roque. 19, Sogod. 20, Tacloban. 21, Tanauan. 22, Telegrafo, Tolosa. 23, Tigbao. **Inset:** Position of Leyte among Philippine Islands. Adjacent islands: B = Bohol. C = Cebu. L = Luzon. M = Mindanao. S = Samar. Map prepared by James Senior.

the species that had been represented only in Rabor's lost 1937 collection, not found by later collectors, were taken again by Rabor in 1964, thus providing voucher specimens for Leyte. Most of this collection was divided between the FMNH and the USNM; 20 of the 1964 specimens are now at the DMNH and four at the UMMZ. According to Dr. Rabor, a few specimens were deposited at Silliman University, Dumaguete City, Negros, Philippines. No list of these is available, but all are essentially duplicates of material now in museums in the United States. The present location of individual specimens I have examined is duly noted in the text that follows. I made detailed studies of the FMNH component in March 1973, after which most of the present manuscript was completed in first draft. The material in the USNM was examined and listed during a brief visit to Washington in April 1973, but detailed study was, with a few exceptions, not possible. In listing collectors in the species accounts, reference will be made to "Rabor 1937" for the lost collection and "Rabor 1964" for the composite recent collection. The text should make it clear how the collection was divided among the several museums previously listed.

Between 1964 and 1971, the Migratory Animal Pathology Survey (MAPS) of the U. S. Army Research and Development Group, Far East, sponsored bird-banding programs in 240 localities in 20 Asian countries, including the Philippines, under the general supervision of Dr. H. Elliott McClure. Results of this immense project have been summarized in annual reports and in a total list of birds banded (McClure and Leelavit, 1972). I am indebted to Dr. McClure for copies of these reports. Birds that were banded in or recovered from Leyte, and that are mentioned in the reports, are so indicated in the species accounts later in this paper. A full list of all banding recoveries from this project has not yet been published.

I have not visited Leyte myself, and the present paper does not pretend to be more than a list of the species and subspecies of birds recorded from the island, with (mostly taxonomic) annotations. At my request, therefore, Dr. Rabor prepared a brief description of his 1964 expedition, with emphasis on the habitats visited. His report, which I have very slightly shortened and edited, is as follows:

SILLIMAN UNIVERSITY BIOLOGICAL EXPEDITION TO LEYTE, APRIL–JULY 1964

BY D. S. RABOR

From the last week of April until the middle of July 1964, a biological expedition from Silliman University, Dumaguete City, headed by this writer [Rabor], worked on Leyte Island and collected mammals, birds, reptiles, and amphibians, and the arthropod parasites on them. I also collected field data on the general habits, breeding habits, altitudinal and ecological distribution, and status of conservation of the terrestrial vertebrates in the localities visited. For the duration of the project, the expedition party of 25 regular members and 10 to 12 emergency and casual helpers was divided into three smaller groups, which operated simultaneously in different collecting places in the region being worked in at the time.

Collections and field observations were conducted mainly in the vicinity of Mount Lobi, in the interior region of the Municipality of Burauen, in the north-central part of Leyte. Actual collecting activities started during the first week of May, although the expedition party was already in the area during the last few days of April, making surveys for the best site for the main camp. Work was carried on in these localities until the first week of June. Collecting and field observations were conducted in as many habitat types as were accessible in this region of Leyte, at elevations ranging between 300 and 1000 meters above sea level.

In the second week of June, the expedition party transferred to the south-central region of Leyte, in the vicinity of the Municipality of Mahaplag. Collections and field observations were conducted mainly in the hilly and mountainous interior between the town of Mahaplag and the distant mountains east of it, especially in the vicinity of Paniniklan in the general area of Mount Kabalanti-an, at elevations between 300 and 800 meters above sea level.

The Leyte Island expedition project was supported mainly by the following institutions:

1. U.S. Army Medical Research and Development Command, Office of the Surgeon General, Washington, D. C. (in connection with arbovirus studies in the Philippines);
2. Smithsonian Institution, Washington, D. C.;
3. Field Museum of Natural History, Chicago, Illinois; and
4. Silliman University, Dumaguete City, Philippines.

Descriptions of Collecting Localities

Mount Lobi localities (300–1000 meters). This region in north-central Leyte is predominantly hilly and mountainous. Collecting and field studies began in the immediate vicinities of Barrio Tambis and Barrio Buri, including the localities of Ma-alngon and Pana-on Peak, all in the interior of Burauen Municipality. Field work was then extended into the more interior sitios and other unnamed sites among the hills and mountains of the region. The work was directed toward the prominent peaks and ridges of Mount Lobi and nearby peaks, but we discovered that Mount Lobi itself was very difficult to reach from our area. We were unable to collect on the ridges and main peak of Mount Lobi, although collecting and field observations were carried on extensively on some of the ridges and peaks that were accessible to our parties.

The interior localities that were accessible from Barrio Tambis and Barrio Buri were well cultivated in many places, and there were already a number of well-developed farms, especially in rolling country and on the low hills. On the slopes of the lower mountains there were a good number of cleared areas, which were maintained by the people who lived in the nearest barrios or sitios as "Kaingin" farms or slash-burn clearings. The small valleys and the narrow strips of flatland among the hills were all cultivated, although still surrounded by large tracts of mixed second growth and grasslands. Even the gentler slopes of the higher mountains in the area were beginning to be cleared up to elevations of about 500 meters above sea level. The ridges and summits of the mountains were still covered by good tracts of original dipterocarp forest and transition dipterocarp–mid-mountain forest.

Many Kaingin or slash-burn clearings were abandoned for new areas, and these places were already covered with patches of dense second growth mixed with tall grass. A great part of the cleared areas in rolling country and on the hills was already covered with the parang type of vegetation—mixed patches of second growth and grasslands consisting mostly of tall grass species, largely Kogon grass (*Imperata exaltata* Brongn. and *I. cylindrica* [Linné] Beauv.) and Talahib (*Saccharum spontaneum* var. *indicum* Hack.). On the hills and lower parts of the mountain slopes that were already cleared but abandoned permanently or temporarily for other sites, good-sized areas of secondary forest had already developed. From the higher elevations of the mountains, including their ridges and summits, larger tracts of original dipterocarp forest extended down to the lower elevations, following the courses of the mountain streams and ravines and appearing as tongues of dense primary forest growth.

As a whole, the interior localities of the Mount Lobi Range where we worked were a mixture of cultivated fields, cleared hills, parang country, secondary forest, primary dipterocarp forest, and small areas of mixed or transition dipterocarp—mid-mountain forests, the latter found only at the highest elevations on the mountain peaks.

Mount Kabalanti-an localities (300–800 meters). Collections were carried on mainly in the hilly and mountainous region between the large river that flowed close to the town of Mahaplag and the distant mountain range toward the eastern coast of Leyte. Collecting started in the flatlands along the river and extended into the interior in the direction of the east coast. The field work was conducted in the localities of Paniniklan, Santa Cruz, Malinao, and on Bulog Peak. In addition, many other localities whose names were not certain, but all on the western part of the Mount Kabalanti-an Range, on the way toward the east, were also visited.

The area along the river near Mahaplag and into the interior for about 1 kilometer was well cultivated into regular farms, planted to corn, rice, and other food crops. Deeper in the interior toward Mount Kabalanti-an was mixed rolling country, hills, and mountains estimated to be about 400–600 meters above sea level. In the area of rolling country were quite a number of settlers maintaining regular farms. Farther still into the interior, among the hills and low mountains, the hillsides and lower parts of the mountainsides were already cleared in many places. Closer to the higher elevations of Mount Kabalanti-an the mountainsides were partly cleared, and many areas were covered with second growth forest and parang vegetation. On the ridges and on the summits of the higher peaks there were still good tracts of original dipterocarp forest. The vegetation types found on Mount Kabalanti-an and surrounding localities were similar to those of the Mount Lobi region.

Both collecting regions in the north-central and south-central parts of Leyte were well on the way to being badly deforested in 1964. I had had the opportunity to conduct collecting and field studies of birds and mammals in central Leyte, in the regions between Baybay and Abuyog municipalities in April–May 1937. In this expedition I also had the opportunity to survey portions of the Mount Lobi and Mahaplag areas. At that time, the entire interior regions of both the Mount Lobi and Mahaplag areas, even in the lowlands, were predominantly original dipterocarp forests, which were only beginning to be logged. The logging and excessive clearing of the original vegetation to make room for farms was chiefly along the newly completed Baybay-Abuyog road, which cut across the island from east to west. This road ran a little south of an imaginary strictly east-west line from coast to coast in the middle of the island. In 1937 there were very few well-cultivated farms along this road, especially in the Helosig region close to the middle of the island. In 1964, along the sides of this same road, and for several kilometers into the interior in both directions, were already well-cultivated farms and numerous permanent human settlements, mostly large barrios. As in other parts of the Philippines, regions formerly covered with extensive tracts of original dipterocarp forest in 1937 had, by 1964, become farms, coconut groves, abaca plantations, and permanently inhabited settlements.

INTRODUCTION TO SPECIES LIST

As mentioned in the acknowledgments of *Philippine Birds* (duPont, 1971: viii), my unpublished notes were made available to Dr. duPont for use in his book. Several species are thus credited to Leyte in the book that have not otherwise been recorded from that island in print. The published and previously unpublished records in the present paper serve as documentation for all Leyte records in *Philippine Birds*; a few records that do not appear in the book are included in this paper, chiefly those in the Rabor 1964 collection, which I did not study until after duPont's book was published. For convenience, nomenclature and sequence of species in this paper generally follow those in *Philippine Birds*; differences are mentioned and explained in the appropriate species account. I have followed duPont's family sequence simply for convenience of cross-reference, although I prefer alternative placement of several passerine families. In general, I find the sequence of passerine families of Storer (1971) an acceptable compromise among competing published classifications. A faunal list such as the present paper is not the place for extended discussions of family sequences.

For each form recorded from Leyte, the scientific name with author and date is given; full bibliographic citations to names can be found in duPont (1971), including those for some names accepted here but synonymized by duPont. For a few names that do not appear in duPont's book, full bibliographic citations are given herein. The minimal information given for each form is a list of the collectors who have taken it (or persons who have seen it) on Leyte. In many instances taxonomic discussions are presented, and a few species have additional information (breeding, habitat, corrections to literature).

SPECIES ACCOUNTS

FAMILY ARDEIDAE HERONS

***Ixobrychus cinnamomeus* (Gmelin, 1789)**

Collected by Everett.

***Gorsachius goisagi* (Temminck, 1835)**

An adult ♂ was collected by Holder at Tigbao (a few miles northwest of Tacloban) on November 11, 1945. This is the first record for Leyte. According to the label, this heron was taken "high on mt. in jungle."

***Butorides striatus javanicus* (Horsfield, 1821)**

Everett collected two specimens of this species, an adult ♂ in July and an immature in September. The July specimen most probably belongs to the resident race rather than to the migrant *amurensis*; the September bird is placed here conjecturally. The only other Leyte specimen was taken by Holder at the Tacloban airstrip on December 1, 1945 and is definitely referable to *javanicus*. It should be noted that duPont (1971, 1972a, 1972b) and duPont and Rabor (1973) inadvertently spelled the name of this subspecies as "*javensis*."

***Bubulcus ibis coromandus* (Boddaert, 1783)**

I know of no Leyte specimen of the ubiquitous Cattle Egret. One individual banded at Wan-fu, I-lan, Taiwan (24°45′ N., 121°40′ E.) on June 25, 1965 was recovered at Dulag, Leyte, on March 16, 1966 (McClure, [1967]:124).

***Egretta garzetta garzetta* (Linné, 1766)**

Ardea Garzetta Linné, Syst. Nat., ed. 12, 1, 1766:237 ("in Oriente," restricted to Malalbergo, S.E. Italy, by Grant and Mackworth-Praed [1933]).

There is inconsistency in the literature as to which race of Little Egret occurs in the Philippines. Recent handbooks, including Delacour and Mayr (1946) and duPont (1971), have followed Peters (1931) in assigning Philippine birds to *E. g. nigripes* (Temminck, 1840), described from the Sunda Islands. I have examined the same material in the AMNH seen by Amadon and Woolfenden (1952) and agree with them that true *nigripes* does not occur in the Philippines. In that race, as the name suggests, the toes are black and concolorous with the legs, whereas in *E. g. garzetta* the toes are yellow, contrasting with the legs. Banding recoveries have clearly shown that Little Egrets from Japan, which are consistently assigned to *E. g. garzetta* in the literature, winter commonly or even chiefly in the Philippines (McClure, 1968:126). The nominate race should therefore be added to the list of Philippine birds, and *E. g.*

nigripes deleted. The *resident* Philippine Little Egrets almost certainly belong to a third subspecies, which may be undescribed. The feet of breeding specimens have been described as greenish yellow, with black spots on the toes (Tweeddale, 1877:703; McGregor, 1909:167). This is consistent with a few museum specimens I have seen whose dried feet suggest that they were probably much duller in color in life than those of true *E. g. garzetta*.

This species has been collected on Leyte only by Everett and Holder. The latter took an adult ♂ 1 mile west of Palo on November 18, 1945 and another at the Tacloban airstrip on November 27. Both specimens are beginning their prebasic molt; in the first bird, one of the crown plumes of the alternate plumage is present as a worn stump 26 mm. long. I cannot separate either of these specimens from a European series of *E. g. garzetta.*

Egretta intermedia intermedia **(Wagler, 1829)**

I know of no Leyte specimen of this egret. One individual banded at the Shinhama Refuge, Ishikawa, Chiba, Japan (35°40′ N., 139°55′ E.) on June 23, 1964 was recovered at "Oromoc" [*sic* = Ormoc] City, Leyte, on December 12, 1965 (McClure, [1967]:125).

Ardea purpurea manilenis **Meyen, 1834**

Collected by Steere.

Nycticorax caledonicus manillensis **Vigors, 1831**

Collected by Everett.

FAMILY **CICONIIDAE** STORKS

Ciconia episcopus episcopus **(Boddaert, 1783)**

Collected by Everett.

FAMILY **ANATIDAE** DUCKS

Dendrocygna arcuata arcuata **(Horsfield, 1824)**

Collected by Everett.

FAMILY **ACCIPITRIDAE** HAWKS AND EAGLES

Pernis apivorus philippensis **Mayr, 1939**

Collected only by Rabor 1937; no Leyte specimen now known to me.

Elanus caeruleus hypoleucus **Gould, 1859**

Collected by Bartsch.

Haliastur indus intermedius **Blyth, 1865**

Collected by Everett, Rabor 1937, Holder, and Rabor 1964. The Holder collection contains four adults and two immatures of this species.

All were taken in the general vicinity of Tacloban between mid-September and the end of November 1945, but only one adult, taken November 20 at the Tacloban airstrip, has exact data. One of the other adults is now at LSU. Rabor collected an adult ♂ at Tambis on May 4, 1964 (USNM).

Spilornis holospilus holospilus (Vigors, 1830)

Collected by Everett, Holder, and Rabor 1964. DuPont (1971:42) uses a binomial for this species, synonymizing with *holospilus* both *panayensis* Steere, 1890 and *palawanensis* Sclater, 1919. I have not investigated the latter, but it should be pointed out that both Peters (1931:273) and Brown and Amadon (1968:361) recognize *palawanensis* as a valid race not of *holospilus* but of the closely related species *Spilornis cheela* (see also Rand, 1951a:576). Brown and Amadon do not even mention *panayensis,* but specimens I have examined uphold its validity as a small, pale race. I suspect that the range of wing measurements given by Brown and Amadon for the species *S. holospilus,* 332–338 mm. (not separated by sex), must be a typographical error. Measurements published by Rand (1951a) for various populations range from 299 to 386 mm. The wing lengths of specimens I have measured and that were not seen by Rand verify his separation of *panayensis* and *holospilus.* Weights published by Rand and Rabor (1960) suggest that the size difference may be even more significant than is indicated by wing length. For *holospilus* these authors gave weights of ♂ 602.8, 762 gm.; ♀ 691.4 gm.; sex? 680.5 gm. For *panayensis* they gave ♂ 522 gm.; ♀ 484.5, 564 gm.

Holder's specimen, an adult female, was collected 1 mile west of Palo, November 18, 1945. Rabor collected seven adults in the Mount Lobi area from May 2–28 (5 USNM, 2 FMNH) and an adult male on June 12 and an unsexed juvenile on June 27 in the Mount Kabalanti-an area (USNM). The June 12 adult, from Santa Cruz, is exceptionally small (wing 327 mm. versus 344–354 for four other Leyte males) and has pale underparts. All other Leyte specimens have the dark underparts typical of *S. h. holospilus.* Rand (1951a) mentioned occasional pale *panayensis*-like individuals in populations of *holospilus* on Mindanao. In view of the small size as well as the pale color, the possibility must be considered that this bird was in fact a stray from the range of *panayensis,* a distance easily within the flight range of a large bird of prey.

Circus aeruginosus spilonotus Kaup, 1847

No specimens. Lint and Stott (1948:42–43) published a sight record of a Marsh Harrier attacking and killing a Philippine Cockatoo (*Kakatoe haematuropygia*) at the San Pablo airstrip, Leyte, on March 2, 1946.

Brown and Amadon (1968:382) give an excellent description of this harrier. Delacour and Mayr (1946:49) erroneously describe the male as having a "black" head (instead of white with dark streaks). DuPont's

(1971:42) description is confined to the adult male, but as Delacour and Mayr correctly state, females and immatures are very different. Also, duPont's average wing length of 345 mm. is probably a typographical error. Brown and Amadon give wing ♂ 378–410 (mean 392), ♀ 395–423 (mean 409). The pair in CM measures ♂ 393, ♀ 434.

***Circus melanoleucus* (Pennant, 1769)**

No specimens. Lint and Stott (1948:42) state that "an individual of this strikingly marked hawk was seen near Burauen, Leyte, in August, 1945." This seems an unusually early date; Brown and Amadon (1968:405) state that "the earliest birds arrive in winter quarters in late September, but more in October, the peak of the southward passage being about the first ten days of October."

***Accipiter virgatus* subsp.**

Collected by Whitehead, Alcasid and Celestino, and Rabor 1964. The current literature assigns the subspecies *A. v. confusus* Hartert, 1910 as the resident form of the Besra Sparrow-Hawk of the entire Philippine archipelago. Examination of small series in various museums suggested that this was an oversimplification, so specimens were borrowed and assembled at the AMNH, where material of non-Philippine subspecies was also available. The composite series examined from the Philippines numbered 45, undoubtedly representing almost all of the specimens in American museums. It then became obvious that Mindanao birds were easily separable from *confusus* of Luzon (type locality Laguna de Bai), with specimens from intervening islands showing varying degrees of intergradation.

The Mindanao population may be known as:

***Accipiter virgatus quagga* new subspecies**

Type FMNH 274988, adult ♂ collected on Mount Katanglad (5000–5500 feet), Malaybalay, Bukidnon Province, Mindanao, Philippines, on February 19, 1963, by D. S. Rabor (collector's no. 34,849).

DIAGNOSIS: The two fully adult males examined from Mindanao differ from Luzon *confusus* in lacking any barring on the underparts, which are virtually solid rufous from the breast to the lower abdomen; in the type, the abdominal feathers are tipped with gray, and in paratype YPM 61569 they are mixed with gray. In adult males of *confusus* the abdomen is always barred with a mixture of white, rufous, and gray, the barred area extending a varying distance anteriorly. The thighs of adult males of *quagga* are also unbarred, either gray with a tinge of rufous (paratype) or rufous washed with gray (type); in *confusus* the thighs are regularly barred with white and either gray, rufous, or a mixture of the two colors. The dark gray or blackish line bisecting the white throat is less prominent than in *confusus*. Tail barring tends to be quite variable in *confusus*, but the dark bars of the tail of *quagga* are narrower, rectrix for rectrix, than in most *confusus*. The under wing-coverts of *quagga* are more heavily washed with pale rufous and less heavily spotted with black.

Adult females differ from *confusus* similarly in the reduction of the barring of the underparts, although in this sex some white bars are still present, especially on the lower abdomen and on the basal portions of breast and side feathers. The throat line and under wing-covert characters apply to females, but the difference in tail barring does not.

Some of the specimens listed as "imm." in the list of specimens examined (following) were molting into plumages that agree with the descriptions of the adults of *confusus* and *quagga* just given.

In addition to color differences, *quagga* averages somewhat smaller than *confusus* in wing, tail, and tarsus (see list of measurements following).

Juvenile birds of both sexes are not wholly separable from *confusus*, but the differences described for throat and under wing-coverts are usually valid. In addition, all young Luzon *confusus* examined have at least a few fine dark streaks on the white under tail-coverts, whereas these feathers in Mindanao specimens of similar age are immaculate. There is a tendency for the longitudinal streaks of the underparts of *quagga* to be less bold and browner, less black.

The nearest subspecies to the south of *quagga* is *rufotibialis* of North Borneo. Adult males of these two races are similar in having rich rufous underparts, but in *rufotibialis* the posterior part of the rufous area is barred with white. In addition, the Bornean race has the ground color of the throat pale rufous rather than white, blacker upperparts, and much broader and more conspicuous black bands on the rectrices. Only one female of *rufotibialis* was examined. It is quite unlike the male, being heavily barred below like female *confusus*. The barring of the breast is mixed with black spots and is blacker, less brown posteriorly than in *confusus*. The female also has the broad black tail bands as described for male *rufotibialis*.

RANGE: Island of Mindanao, intergrading northward through the eastern islands with *confusus*. Luzon and Mindanao populations represent clinal extremes, as is the case in several other Philippine species. Mindoro adults cannot be separated from Luzon *confusus* except for a slightly narrower throat stripe; two Mindoro juveniles, in addition to the narrower throat stripe, have the browner, less bold ventral streaks typical of *quagga*. The only Negros adult examined, a female, is best assigned to *confusus*. Obvious intergradation between *confusus* and *quagga* takes place through the eastern chain of islands. Two adult males from Bohol are closest to *quagga* but have faint abdominal barring, and one of the two has faintly barred thighs. Two adult males from Samar are more clearly intermediate, with more definite ventral barring, but this still chiefly posteriorly. One has faintly, the other strongly barred thighs. In throat pattern they resemble Mindoro birds, while the under wing-coverts are like those of Luzon *confusus.* Only a single adult from Leyte, a female, was available. It is intermediate, with the general color of the underparts nearest *quagga,* but the thighs heavily barred and the under wing-coverts heavily spotted. The throat stripe is of intermediate width. Two juvenile males from Leyte have the bold throat stripe and under wing-covert colors of *confusus,* but they have very brown ventral streaking and immaculate under tail-coverts, characters of *quagga.* A single juvenile female from Leyte is similar but has blacker streaks.

MEASUREMENTS: *confusus*—(Luzon only) ad. ♂: wing (flat) 152–162 (157.1), tail 109.5–120 (114.9), tarsus 47–51.5 (49.0); ad. ♀: wing 182.5 and 193, tail 132.5 and 145, tarsus 53 and 55. *quagga*—(Mindanao only) ad. ♂: wing 146 and 147, tail 107.5 and 110, tarsus 45.5 and 46.5; ad. ♀: wing 177, tail 130, tarsus 51.5. Bohol ad. ♂: wing 150 and 154, tail 111 and 112, tarsus 47 and 48. Samar ad. ♂: wing 148 and 152, tail 109 and 111, tarsus 47 and 47. Leyte ad. ♀: wing 178, tail 134, tarsus 56. Mindoro ad. ♂: wing 154, tail 115.5, tarsus 48.5; ad. ♀ wing 179+ (worn), 179. 5, and 180; tail 136 and 138; tarsus 52.5, 53.5, and 54.

ETYMOLOGY: The subspecific name, to be treated as a noun in apposition, is taken from *Equus quagga quagga,* the extinct zebra that differed from its close relatives in its much reduced striping.

SPECIMENS EXAMINED: Luzon: ad. ♂, 10 (including type of *confusus*); ad. ♀, 2; imm. ♂, 4; imm. ♀, 2. Mindoro: ad. ♂, 1; ad. ♀, 3; imm. ♂, 1; imm. ♀, 1. Negros: ad. ♀, 1; imm. ♂, 2; imm. ♀, 2. Leyte: ad. ♀, 1; imm. ♂, 2; imm. ♀, 1. Samar: ad. ♂, 2. Bohol: ad. ♂, 2, imm. ♂, 1. Mindanao: ad. ♂, 2; ad. ♀, 2; imm. ♂, 1; imm. ♀, 2. North Borneo: ad. ♂, 3 (including type of *rufotibialis*); ad. ♀, 1.

Data for hitherto unpublished Leyte records are as follows: Alcasid and Celestino took a juvenile male at Balinsasayao on July 16, 1961. Rabor took an adult female at Tambis on May 4, 1964 and a juvenile male and female on Mt. Kabalanti-an on June 23. The juvenile male is in the FMNH; the other two Rabor specimens are in the USNM.

Accipiter trivirgatus extimus **Mayr, 1945**

Collected by Everett, Holder, and Rabor 1964. In looking over a few specimens from the Philippines, I saw that there is obviously variation within the range assigned to *extimus.* It was difficult to assess this variation, so an undoubtedly unprecedented series of 30 specimens belonging to eight museums was assembled in an effort to clarify the matter. It became apparent that there is a tendency toward differentiation in the Davao region of southeastern Mindanao (the type locality of *extimus*). It is expressed, however, *only* in definitively plumaged males and is not quite consistent in these, so it seemed unwise to name an additional subspecies. Seven adult males from Davao (including the type of *extimus*) were compared with three from Samar, three from Negros, one from Leyte, and one each from Bukidnon and Cotabato provinces, Mindanao. The Davao birds are much paler on the underparts than the males from elsewhere, *except* that FMNH 185134 is too dark below for the Davao type, and two of the nine from elsewhere (YPM 23516, Negros, and FMNH 276278, Leyte) are pale below like Davao birds. Dorsally the non-Davao birds are darker as well, with the dark color extending to the cheeks. In this character the specimens mentioned above do conform with the rest of their respective series, but UMMZ 114042 from Calicoan Island, Samar, and FMNH 184026 from Cotabato Province are too pale-headed for their group.

There is no consistent difference, but much variation, among definitively plumaged females. The Holder specimen, collected "high on mt. in jungle" at Tigbao, Leyte, on November 11, 1945, is by far the darkest female examined; its extreme coloration originally stimulated the study of this species. However, it is also the freshest-plumaged bird of the series of adult females (Davao, 2; Samar, 3; Leyte, 1; Bukidnon, Mindanao, 1), probably accounting for its relatively dark color. Comparisons among eight immatures (Davao, 4; Negros, 1; Leyte, 1; Zamboanga, Mindanao, 2) also failed to reveal any consistent pattern of geographic variation.

Everett's specimen from Amparo (BMNH 1887-11-1-110) was sexed as a female; but Tweeddale (1878:340) stated, "In Mr. J. H. Gurney's opinion this Leyte example is in immature plumage, and probably belongs to a male." Mr. Gurney was correct: the plumage is indeed that of an immature bird, and the wing measurement of 189 is that of a male. Seven males had wings from 182 to 193 mm., and four females ranged from 203 to 217 mm.

In addition to the Holder bird, unpublished specimens include an adult male taken by Rabor on Mt. Kabalanti-an on June 23, 1964 (FMNH) and an adult male and female taken at Tambis on May 16 and June 3 (USNM). The latter two specimens were not utilized in the comparisons.

Butastur indicus **(Gmelin, 1788)**

Collected by Celestino, Bivins, and Holder. There have also been Leyte recoveries of banded birds. Gray-faced Buzzards banded at Mitakojima in the Ryukyu Islands on October 29, 1964 and October 17, 1965 were recovered at Maasin and Burauen, Leyte, on January 23, 1965 and February 7, 1966 respectively (McClure, [1967]:131). Four other banded individuals were recovered in Leyte in 1968, but no details were published (McClure, 1969:179).

Celestino's specimen or specimens, the first to be reported from Leyte, were taken for parasitological studies (Tubangui and Masilungan, 1937). Even if skins were preserved (which is not known), the specimens would have perished in the burning of the National Museum in Manila in 1945.

By buteonine standards, this is not a particularly variable species. However, the Bivins specimen (CU 21378, imm. ♀, Tacloban, January 1946) is in two respects completely outside the range of variation of the extensive series examined in the AMNH and YPM. The dorsum is a blacker brown, but even more conspicuous is the reduction to the point of obsolescence of the tail barring. The central rectrices (one broken) have only a faint subterminal darkening, and no other bars at all. The remaining rectrices have faint indications of bars on the inner web, except the outermost pair, in which there is merely a marbling of white on the inner web. The specimen does appear to be referable to *Butastur indicus,* but whether it is an aberrant individual or a migrant from some undescribed local population cannot be stated at this time.

Occasional individuals are strikingly more rufescent than the majority of this species. Among wintering Philippine birds of this type are AMNH 93558 from Sorsogon, Luzon; AMNH 459062 from Lamao, Bataan, Luzon; and one of Holder's Leyte specimens, CM 138374, a fresh-plumaged immature female taken in "jungle" at Limon, November 4, 1945. The latter specimen is one of the most rufescent specimens of this species examined. As in the case of the odd Bivins specimen, there is no evidence as to whether these rufescent birds represent individual variants or migrants from a discrete population.

The other Holder specimen, an immature tentatively sexed as female by the collector, was taken 1 mile west of Palo on October 31, 1945. It is somewhat more worn and decidedly less rufescent than the Limon specimen. Brown and Amadon (1968:542) gave wing measurements for this species as ♂ 315–325 mm., ♀ 322–336 mm. Holder's definitely sexed female measures 332 mm., and the tentatively sexed bird 320 mm. At only 2 mm. shorter than Brown and Amadon's smallest female, this wing measurement cannot be considered as sufficient evidence to state that Holder missexed the bird.

Pithecophaga jefferyi Ogilvie-Grant, 1896

No Leyte specimens exist, but Whitehead, who discovered the species on Samar and was thoroughly familiar with it, heard its call frequently during his short stay on Leyte (Ogilvie-Grant, 1897:219). DuPont (1971:47) states that the Monkey-eating Eagle "formerly" occurred on Leyte. I am inclined to doubt whether parts of the interior of the island have been surveyed thoroughly enough to be certain that the species does not survive there.

Spizaetus philippensis **Gould, 1863**

The only Leyte record for this species is a specimen collected by Holder 1 mile west of Palo on November 13, 1945. The collector sexed the bird as ♀? The wing measurement of 326 mm. exactly matches that of one immature male given by Brown and Amadon (1968:700), whereas one immature female measured 353 mm. It is unfortunate that neither of the standard modern works on Philippine birds, Delacour and Mayr (1946) and duPont (1971), describes the immature plumage of the Philippine Hawk-Eagle, which is highly distinctive. The Leyte specimen is a good match for the description given by Brown and Amadon (1968:700), but it is even paler. The entire head (except for the four long, black crest feathers) is creamy white, with narrow, dark brown shaft streaks at the tips of the posterior crown feathers. The thighs are not "darker" than the rest of the white underparts (which are somewhat stained in this specimen) but are pure white, and the light cinnamon barring described by Brown and Amadon, while present, would probably not be visible in the field. They describe the upperparts as "dark greyish brown . . . mixed and edged with white." In the Leyte specimen, the anterior dorsal feathers are white for the basal two thirds or so, only the tip being dark brown. Under field conditions, the foreback would probably look white spotted with brown. The long feathers of the midback are dark brown with whitish edges; although white at the base, normal overlap conceals this. Most of the rump feathers are new and are pale grayish brown; the few remaining old, worn juvenile feathers of the rump suggest that this area would have appeared nearly white in the field. The eye color of the immature *Spizaetus philippensis* is given by Brown and Amadon as "pale brownish gray"; this may have been noted from a younger juvenile, as Holder recorded both the eye and toe color of his bird as yellow.

FAMILY **FALCONIDAE** FALCONS

Microhierax erythrogonys meridionalis **Ogilvie-Grant, 1897**

Collected by Rabor 1937, Alcasid and Celestino, Caliwag, and Rabor 1964. Meyer de Schauensee and duPont (1962:152) thought the two Caliwag specimens from Abuyog were the first from Leyte, but they overlooked Rabor's 1938 paper. Alcasid and Celestino collected an adult female and a juvenile female at Balinsasayao July 15, 1961 and a very worn male at Patok on August 3. Rabor collected an adult male and female at Tambis on May 11 and June 2, 1964 (USNM).

FAMILY **MEGAPODIIDAE** MEGAPODES

Megapodius freycinet pusillus **Tweeddale, 1877**

No Leyte specimens. Rabor (1938) reported this species as seen but not collected in the highlands, presumably somewhere near Barrio Helosig.

FAMILY **PHASIANIDAE** PHEASANTS

Gallus gallus philippensis **Hachisuka, 1939**

Collected by Rabor 1937, Alcasid and Celestino, Caliwag, and Rabor 1964. Meyer de Schauensee and duPont (1962:152) could find no Leyte record for the Red Junglefowl prior to the Caliwag specimens, but they had overlooked Rabor's 1938 paper. Alcasid and Celestino took an adult male at Balinsasayao on July 7, 1961. Rabor (USNM) collected an adult male at Tambis on May 27, 1964 and two adult females in the Mount Kabalanti-an area on June 12 and 27. This subspecies was not admitted by duPont, but see Parkes, 1962a.

FAMILY **RALLIDAE** RAILS

Rallus striatus striatus **Linné, 1766**

Everett collected a male and female at Amparo in July 1877 and another male and female and a young male in "S. Leyte" in September (Tweeddale, 1878:345). There have been no subsequent Leyte records.

Rallus torquatus torquatus **Linné, 1766**

Collected by Everett, Holder, and Rabor 1964; sight record by Rabor 1937. The Holder specimen was taken near Tacloban between mid-September and the end of November 1945, but it lacks exact data. Rabor's specimen (USNM) was taken at Santa Cruz on June 23.

Rallina eurizonoides eurizonoides **(Lafresnaye, 1845)**

Collected only by Everett.

Porzana fusca fusca **(Linné, 1766)**

Collected by Everett and by Rabor 1964. The latter took an adult at Tambis on May 8 (USNM).

Poliolimnas cinereus ocularis **Sharpe, 1894**

Collected by Everett, Steere, and Holder; sight record by Rabor 1937. Holder's specimen, a male just beginning its first prebasic molt, was taken at the Tacloban airstrip on October 30, 1945. The iris was "maroon."

Olson (1970) has proposed enlarging the genus *Poliolimnas* to include the neotropical species *Porzana flaviventer*. Careful study of his paper shows that the supposed relationship is based entirely on a superficial resemblance in facial pattern and a supposed difference in bill shape. Examination of *Poliolimnas cinereus, Porzana flaviventer,* and about half a dozen other species of *Porzana* shows that even the bill character is inconsistent. Several *Porzana* have the bill shape described for *Poliolimnas,* and at least some specimens of the latter match Olson's diagnosis for *Porzana.* All *Porzana* that I examined had under tail-coverts barred black and white. The reddish buff under tail-coverts of *Poliolimnas cinereus,* contrasting with the remainder of the underparts, are presumably of some selective importance; if *flaviventer* were really related to *cinereus,* one might expect a resemblance in this plumage area, but *flaviventer* matches other *Porzana* in its black and white under tail-coverts. Although generic limits among the crakes may well need redefinition, I see no relationship between *cinereus* and *flaviventer,* and I reject Olson's reclassification.

Amaurornis olivaceus olivaceus **(Meyen, 1834)**

Collected by Everett and by Rabor 1964. The latter obtained a single specimen at Tambis (USNM) on May 10.

Amaurornis phoenicurus javanicus **(Horsfield, 1821)**

The only Leyte record is Caliwag's specimen from Abuyog.

Gallinula chloropus lozanoi **Lletget, 1918**

Everett's specimens (not seen by me) were collected in July, indicating that they probably belong to the resident Philippine subspecies. One or more gallinules were also collected by Celestino for parasitological studies, but there is no way of knowing whether this record pertains to a resident or wintering population.

FAMILY **ROSTRATULIDAE** PAINTED-SNIPE

Rostratula benghalensis benghalensis **(Linné, 1758)**

Collected only by Everett.

FAMILY **CHARADRIIDAE** PLOVERS

Pluvialis dominica fulva **(Gmelin, 1789)**

First collected by Everett. McGregor (1927:514) stated that on October 15, 1923 he "received from Mr. U. C. Roush of Tacloban, Leyte, a fresh unstuffed skin of a golden plover." The unstated assumption is that the specimen was collected in the vicinity of Tacloban. There are five specimens in the Holder collection: October 30, November 2 (two), and November 14, 1945 from Tacloban airstrip, and one without exact data (i.e., vicinity of Tacloban between mid-September and late November 1945). The two November 2 specimens are now at LSU.

Charadrius dubius dubius **Scopoli, 1786**

Everett's series of nine specimens from "S. Leyte" in "full breeding-plumage" (Tweeddale, 1878:344) are assigned to this subspecies on a probability basis. The specimens collected by Rabor 1937 and Caliwag (Meyer de Schauensee and duPont, 1962) were identified as the nominate race. Holder collected an immature specimen of this race (bill from forehead, 18 mm.) at the Tacloban airstrip on October 30, 1945. Rabor collected five specimens at Santa Cruz from June 13–18, 1964 (2 FMNH, 3 USNM); all are in full alternate plumage and show the large amount of black on the head and the yellow on the lower mandible typical of the Philippine breeding race.

Charadrius dubius curonicus **Gmelin, 1789**

Delacour and Mayr (1946:70) stated that this race "may occur as an occasional winter visitor" in the Philippines. DuPont (1971:78) stated simply, "Winters in the Philippines from Asia." There are two immature specimens in the Holder collection, unfortunately without exact data (vicinity of Tacloban, mid-September to late November 1945). They are easily separable from *C. d. dubius* by their shorter and weaker bills (from forehead, 14.5 mm., 16 mm. [approximate; tip broken] versus 18–20 mm. in seven Philippine specimens of *dubius*). These appear to be the first specimens of *C. d. curonicus* reported for Leyte, but the shore birds as a group have been undercollected in the Philippines in general and in Leyte in particular.

Charadrius alexandrinus dealbatus **(Swinhoe, 1870)**

DuPont (1971:79) states of this species, "Winters throughout the Philippines from China and Japan"; Delacour and Mayr (1946:70) characterized it as an "occasional visitor." The only Leyte record is a Holder specimen without exact data (i.e., vicinity of Tacloban, mid-September to late November 1945).

Charadrius peronii **Schlegel, 1865**

Collected by Everett.

Charadrius mongolus mongolus **Pallas, 1776**

Collected by Everett and by Celestino.

Charadrius leschenaultii **Lesson, 1826**

Collected by Everett.

FAMILY **SCOLOPACIDAE** SANDPIPERS

***Actitis hypoleucos* (Linné, 1758)**

Rabor (1938) believed his to be the first specimen of the Common Sandpiper from Leyte, but he overlooked Everett's record (Tweeddale, 1878:345). The species has also been collected by Holder, who took a male at the Tacloban airstrip on December 1, 1945.

I prefer to retain the genus *Actitis* for the Common and Spotted Sandpipers (*A. macularia*), rather than merge these species into *Tringa*.

***Heteroscelus incanus brevipes* (Vieillot, 1816)**

Collected by Everett and by Holder, who took a worn adult male at the Tacloban airstrip on October 25, 1945.

I prefer to maintain the genus *Heteroscelus* for the tattlers rather than merge these, too, into *Tringa*. DuPont (1971:93), who placed this species in the feminine genus *Tringa*, inadvertently spelled the specific epithet as "*incanas*" rather than *incana*.

***Gallinago megala* Swinhoe, 1861**

This abundant winter visitor to the Philippines has been collected on Leyte only by Everett and by Bivins, who took an unsexed bird (CU 21377) at Palo on December 25, 1945.

***Gallinago gallinago gallinago* (Linné, 1758)**

Collected by Everett.

FAMILY **LARIDAE** GULLS AND TERNS

***Chlidonias hybrida javanica* (Horsfield, 1821)**

McGregor (1927:514) states, "On October 15, 1923, I received from Mr. U. C. Roush of Tacloban, Leyte, a wing and a leg of a whiskered tern, a species so far unknown from Leyte." This remains the only Leyte record.

It should be pointed out that duPont's (1971:105) attribution of "Luzon" as the range of *C. h. fluviatilis* (Gould, 1843) is misleading. This race, the Australian representative of the species, is an accidental visitor with one known Philippine specimen (Parkes, 1958).

***Sterna fuscata serrata* Wagler, 1830**

Sterna serrata Wagler, Natursyst. Amphib., 1830:39 (note) (New Caledonia).

The race of Sooty Tern occurring in the Philippines has been listed as *S. f. nubilosa* Sparrman, 1788, which according to Peters (1934:339), extends from the Indian Ocean islands to the Sulu Sea and Ryukyu Islands. The one Leyte record, however, refers to a bird banded on Roach Islet, Lord Howe Island, November 28, 1962 and recovered in

Wawa Strait, southern Leyte, March 4, 1967 during a storm (Rabor *et al.*, 1970). This specimen must belong to the Australian race, which is hereby added to the Philippine avifauna. The record was published too late for inclusion in duPont (1971).

***Sterna bergii cristata* Stephens, 1826**

Collected by Everett.

FAMILY **COLUMBIDAE** PIGEONS AND DOVES

***Treron pompadora canescens* Parkes, 1965**

Collected by Rabor 1937, Alcasid and Celestino, and Caliwag. Meyer de Schauensee and duPont (1962:153–154) overlooked Rabor's published record in stating that the two Caliwag specimens from Dagami were the first from Leyte. One individual of this species was banded at the MAPS station at Mahaplag in 1966 (McClure and Leelavit, 1972:281).

The three specimens collected at Patok by Alcasid and Celestino (July 19 and August 3 and 7) were among the specimens examined at the time of the description of this subspecies (Parkes, 1965b). As then indicated, one of these is slightly atypical, approaching *T. p. axillaris* of southern Luzon in dorsal color.

***Treron vernans vernans* (Linné, 1771)**

Collected only by Caliwag. In publishing this record, Meyer de Schauensee and duPont (1962:154) did not cite a specific locality within Leyte.

***Phapitreron leucotis brevirostris* (Tweeddale, 1877)**

Collected by Everett, Steere, Whitehead, Rabor 1937, Alcasid and Celestino, Caliwag, and Rabor 1964. This is obviously an abundant species on Leyte. The series taken by Alcasid and Celestino at Balinsasayao and Patok includes 19 specimens, and in 1964 Rabor took 24 for the FMNH and 44 for the USNM in the Mount Lobi and Mount Kabalanti-an areas. Meyer de Schauensee and duPont (1962:154) listed Caliwag's nine specimens under the name *P. l. albifrons* McGregor, 1907, but I have shown that this alleged race is untenable (Parkes, 1971c:6–7).

One bird of this species was banded in 1964 and six in 1966 at the MAPS station at Mahaplag (McClure and Leelavit, 1972:281).

***Phapitreron amethystina amethystina* Bonaparte, 1855**

Collected by Steere, Rabor 1937, Alcasid and Celestino, Caliwag, and Rabor 1964. Alcasid and Celestino collected two at Balinsasayao and six at Patok; females taken July 12, 18, and 26 were labelled "Breeding" or "Nesting." Rabor's series from the Mount Lobi and Mount Kabalanti-an areas has been distributed as follows: 23 USNM, 12 FMNH, one DMNH.

Meyer de Schauensee and duPont (1962:154) compared Caliwag's four Leyte birds with two from Luzon (inadvertently spelling the species' name "*amethistina*") and found them to agree well. In comparing the eight collected by Alcasid and Celestino with 10 from Luzon in the AMNH, I found a very slight tendency in Leyte birds toward a grayer crown and blacker upperparts, but not enough to warrant separating them from *P. a. amethystina.* Although I examined only two Bohol specimens, I could not separate these from Luzon birds, and I agree with Rand and Rabor (1960:329) that *celestinoi* Manuel, 1936 cannot be upheld; although they had a much larger series from Bohol, they compared these only with Samar specimens. The type locality "Philippines" of Bonaparte, cited by duPont (1971), has been restricted to Manila by Hachisuka (1930:145). I agree with the broad concept of nominate *amethystina* adopted by duPont (1971:119), except that I consider *polillensis* Hachisuka, 1930 a valid race (Parkes, 1971c:7).

Ptilinopus occipitalis incognitus (Tweeddale, 1877)

Collected by Steere, Rabor 1937, Alcasid and Celestino, Caliwag, and Rabor 1964. DuPont (1971:121) recognizes no races of this species. When I wrote previously on variation in *Ptilinopus occipitalis* (Parkes, 1960), I had not yet seen Leyte specimens. I have now examined the 14 collected by Alcasid and Celestino, the two collected by Caliwag, and the nine 1964 Rabor specimens in the FMNH; and I have made new comparisons with birds from other islands (the 12 Rabor 1964 specimens in the USNM were examined but not compared). These specimens confirm my previous finding that *brevipes* Hachisuka, 1930 is a very distinctive race of the *highlands* of Mindanao; that nominate *occipitalis* Gray, 1844 inhabits Luzon, Mindoro, and Sibuyan; and that an intermediate form, to which the name *incognitus* Tweeddale is applicable, occupies *lowland* Mindanao, Negros, Cebu, Samar, and Leyte. I have not seen Bohol specimens, which undoubtedly belong here as well. In view of the large range occupied by the admittedly intermediate form, it seems preferable to apply the available name *incognitus* rather than to call them all *occipitalis* × *brevipes.*

Ptilinopus leclancheri leclancheri (Bonaparte, 1855)

Meyer de Schauensee and duPont (1962:155) stated that Caliwag's juvenile specimen from Mount Lobi was the first record from Leyte. It is the first (and only) specimen, but there is an earlier sight record. Lint and Stott (1948:43) saw two along the Binalayan River south of Tanauan on January 3, 1946.

Ducula aenea aenea (Linné 1766)

Collected by Everett, Whitehead (overlooked by McGregor, 1909), Rabor 1937, and Alcasid and Celestino. The latter collectors took a single male at Balinsasayao on July 8, 1961.

Ducula poliocephala (G. R. Gray, 1844)

Collected by Whitehead, Rabor 1937, Alcasid and Celestino, and Rabor 1964. DuPont (1971:130) admits *D. p. nobilis* (Hachisuka, 1931), described from Negros, and uses this name for Leyte birds. Rabor (1938:18–19), who collected a series of 17 specimens of this pigeon on Leyte, compared his birds with specimens from Luzon, Mindoro, Negros, Sibuyan, Mindanao, and Basilan. He found that the supposed metallic bronzy reflections on the neck, back, and wing-coverts attributed to *nobilis* by Hachisuka were too variable to invoke as a subspecific character. The limited material I have examined in the AMNH shows that the degree of development of these bronzy reflections is not geographically correlated, but depends on individual variation and degree of plumage wear.

There are, however, some trends of geographic variation in *Ducula poliocephala.* The crowns of specimens from Samar and Leyte are purer gray than those from elsewhere. The brown of the flanks extends farther forward and also invades the abdominal region in Luzon birds. Specimens from Negros are variably intermediate in flank color, but like Luzon birds in crown color. One specimen from Mindoro resembles Luzon birds in crown color, but matches Samar/Leyte birds in flank and abdomen color. In view of this patchwork of variation, the use of more than one name for populations of this species appears to be unwarranted. I follow Peters (1937:53) and other authors in using a binomial for *D. poliocephala*; Delacour and Mayr (1946:90) consider *D. forsteni* of Celebes conspecific, but I have not looked into this question.

Unpublished Leyte records for this species include a single specimen taken by Alcasid and Celestino at Patok on July 7, 1961 and two taken by Rabor on Mount Kabalanti-an on June 27, 1964 (1 FMNH, 1 USNM).

Columba vitiensis griseogularis (Walden and Layard, 1872)

Alcasid and Celestino collected an adult female and a female in first prebasic molt at Patok on August 3 and 10, 1961. These specimens constitute the first record from Leyte of this widely distributed species. I have compared specimens from Luzon, Mindoro, Romblon, Leyte, Negros, Mindanao, and various islands of the Sulu Archipelago. There appears to be no geographic variation within the Philippines in this species.

Macropygia phasianella tenuirostris **Bonaparte, 1854**

Collected by Whitehead, Rabor 1937, Alcasid and Celestino, Caliwag, and Rabor 1964. Unpublished records include four July specimens from Patok (Alcasid and Celestino) and eight from various localities in the Mount Lobi area taken by Rabor between May 26 and June 5 (3 FMNH, 5 USNM). For a discussion of geographic variation within this species in the Philippines, see Parkes, 1971c:8.

Streptopelia bitorquata dusumieri **(Temminck, 1823)**

The only previously published Leyte record is that of Everett. R. P. Grossenheider collected an adult male 1 mile north of Telegrafo (which is 2 miles south of Tolosa) on the east coast on December 17, 1944. According to the label, the specimen (AMNH 461176) was "taken in coconut palm near edge of swamp." Holder collected a specimen 1 mile west of Palo on November 13, 1945.

Streptopelia chinensis tigrina **(Temminck, 1810)**

The range of this species has been rapidly expanding in the Philippines. Delacour and Mayr (1946) knew it only from Palawan and Balabac. Island to island movement is documented by McClure (1968:117): a Spotted Dove banded in Negros in February 1967 was recovered four months later in Cebu. Inclusion of Leyte in the range as given by duPont (1971:133) is based on a specimen collected by Alcasid and Celestino at Balinsasayao on July 7, 1961.

Chalcophaps indica indica **(Linné, 1758)**

The first record for Leyte was the sight record of Rabor (1938), overlooked by Meyer de Schauensee and duPont (1962:155) in publishing Caliwag's two specimens from Abuyog as the first Leyte record. The species has also been collected on Leyte by Alcasid and Celestino, who took two young birds at Patok on August 8 and [no date] 1961; by Holder, who took a pair of adults 1 mile west of Palo on November 16, 1945; and by Rabor, who collected 12 in the Mount Lobi and Mount Kabalanti-an areas (3 FMNH, 9 USNM). At the MAPS station at Mahaplag, one was banded in 1964 and 20 in 1966 (McClure and Leelavit, 1972:281).

Gallicolumba criniger leytensis **(Hartert, 1918)**

Collected by Whitehead, Rabor 1937, Alcasid and Celestino, and Rabor 1964. I have already (Parkes, 1962b:2–3) explained my preference for treating the vicariant forms of the Bleeding-heart Pigeon as a single superspecies divided into several geographically variable allospecies, in order best to express the various stages of differentiation that have been attained. The Leyte population, according to this concept, belongs in the polytypic species *G. criniger*; *G. luzonica*, rather than including all of the races, is thus restricted to the two Luzon forms *G. l. luzonica* and *G. l. griseolateralis.*

The discussion of the *criniger* group by Delacour and Mayr (1946:96) is inadequate and misleading. They describe *basilanica* (Hartert, 1918) as "very slightly differentiated" from *criniger* of Mindanao, but "a little darker in color." In point of fact, Hartert (1918) separated *basilanica* from *criniger* on the basis of smaller size; the only color character mentioned ("generally the rump is a little lighter") is the exact opposite of Delacour and Mayr's description. I have not measured a series of specimens and cannot refute Hartert's size separation; the one Basilan specimen in CM, with a wing of 148 mm., conforms well with Hartert's figures. I do not know the basis for duPont's (1971:138) having synonymized *basilanica* with *criniger.*

As for *leytensis,* Delacour and Mayr (1946:96) characterize it also as "very slightly differentiated" from *criniger,* this time "a little lighter [in color]." This ignores completely the chief difference between *leytensis* on the one hand and *criniger/basilanica* on the other. In the latter races, the "blood patch" is bordered on the sides by the extended white of the throat patch, and posteriorly by the reddish cinnamon of the posterior underparts. In *leytensis* the "blood patch" is bordered by white only anteriorly, being placed in a broad dark breast band that is metallic green anteriorly, changing to gray posteriorly. The cinnamon on the underparts begins much farther back, and there is much more white on the midabdomen in *leytensis* than in *criniger/basilanica.* The description of *leytensis* given by duPont (1971:139) is based on these notes. Samar and Leyte specimens are identical.

Alcasid and Celestino collected two females at Balinsasayao on July 7 and 12. Rabor took a single specimen at Mount Lobi on May 28 ("active ovary") and June 4 (USNM) and at Mount Kabalanti-an on June 20 and 26 (FMNH).

FAMILY **PSITTACIDAE** PARROTS

***Kakatoe haematuropygia* (P. L. S. Müller, 1776)**

Collected by Everett, Steere, and Alcasid and Celestino; the latter took a single adult female at Balinsasayao on July 11. In addition, there is a sight record by Lint and Stott (1948:42–43) from the San Pablo airstrip, March 2, 1946.

***Prionoturus discurus discurus* (Vieillot, 1822) > *P. d. whiteheadi* Salomonsen, 1953**

Collected by Steere, Whitehead, Rabor 1937, Alcasid and Celestino, Caliwag, and Rabor 1964. Alcasid and Celestino collected a series of eight adults and five immatures between July 8 and August 8 at their two localities. In the Mount Lobi and Mount Kabalanti-an areas, Rabor took five adults and four immatures for the FMNH and 13 adults and four immatures for the USNM. Two additional Rabor specimens from Mount Kabalanti-an are in the DMNH. Dates range from May 20 to July 9. For a discussion of geographic variation in this species, see Parkes, 1971c:9–10.

Tanygnathus lucionensis salvadorii **Ogilvie-Grant, 1896**

Collected by Everett, Whitehead, Rabor 1937, Holder, Alcasid and Celestino, Caliwag, and Rabor 1964. Previously unpublished Leyte records include an adult male collected by Holder at the Tacloban airstrip on November 20, 1945; six adults and a juvenile collected by Alcasid and Celestino at Balinsasayao (July 9, 12, and 15) and Patok (July 27 and 31 and August 2 and 8); and seven adults taken by Rabor in the Mount Lobi and Mount Kabalanti-an areas between May 3 and July 1 (2 FMNH, 5 USNM). For the use of this subspecific name, see Parkes, 1971c:10–11.

Tanygnathus sumatranus everetti **Tweeddale, 1877**

Collected by Alcasid and Celestino and by Caliwag. These two 1961 specimens represent the first Leyte record for the species. The AMNH specimen, taken at Patok on July 21, is indistinguishable from two Mindanao specimens of *everetti*.

Bolbopsittacus lunulatus intermedius **Salvadori, 1891**

Collected by Whitehead, Rabor 1937, Alcasid and Celestino, Caliwag, and Rabor 1964. The type specimen of *intermedius* in the BMNH is a male without locality data, from the collection of Hugh Cuming. As I have explained (Parkes, 1971a), it matches specimens from Leyte and not Samar. There is no evidence that Cuming himself visited Leyte, but parrots are common cage birds in the Philippines, and Cuming might have obtained this specimen in a market or from an individual almost anywhere. Alcasid and Celestino obtained a series of 10 specimens in their two localities, and Rabor collected seven in his two areas (4 FMNH, 2 USNM, 1 DMNH). One was banded in 1964 at the MAPS station at Mahaplag (McClure and Leelavit, 1972:281).

Loriculus philippensis worcesteri **Steere, 1890**

Collected by Everett, Steere, Whitehead, Rabor 1937, Alcasid and Celestino, Caliwag, and Rabor 1964. The original description did not specify which island was the source of the type specimen, and duPont (1971:150) has followed Steere in giving "Samar and Leyte" as the type locality of *worcesteri*. The type specimen itself is from Catbalogan, Samar (Hachisuka, 1934:97; confirmed in letter of December 21, 1962 from I. C.

J. Galbraith). There is no consistent difference between Samar and Leyte specimens. DuPont (1971:150) compares *worcesteri* with *L. p. philippensis,* but as stated by Rand and Rabor (1960:286, 331) it is closest to *apicalis* of Mindanao, from which it differs only in the lesser amount of orange wash on the dorsum. The unpublished Alcasid and Celestino material includes eight specimens from Balinsasayao and Patok taken between July 7 and 29; that of Rabor consists of 15, all from the Mount Lobi area, taken between May 2 and June 1 (5 FMNH, 10 USNM).

FAMILY **CUCULIDAE** CUCKOOS

Cuculus sparverioides sparverioides Vigors, 1831

Although duPont (1971:154) says of this species simply, "Found throughout the Philippines," it appears to be rare and local, as already suggested by Delacour and Mayr (1946:106). Rabor (1938) collected one female on Leyte and commented that at that time the species had been taken only on Luzon, Negros, and the Calamianes. His specimen, destroyed in 1945, remains the only Leyte record.

Cuculus fugax pectoralis (Cabanis and Heine, 1863)

Rabor collected an immature male at Tambis on May 25 and a subadult female at Ma-alngon on June 6, 1964. These specimens, which are in the USNM, constitute the only Leyte record for the species.

Cuculus micropterus micropterus Gould, 1837

DuPont (1971:155) considered this species a "straggler" to the Philippines, as did (tentatively) Delacour and Mayr (1946:106). DuPont listed only Mindoro and Negros; a specimen in the USNM collected by Rabor, an adult male taken at Ma-alngon on May 29, 1964, is the first Leyte record.

[*Cuculus canorus telephonus* Heine, 1863]

Rabor (1938) listed a female of this species as having been collected on his 1937 Leyte expedition. No other collector has obtained *C. canorus* on Leyte, and Rabor's specimen is no longer extant. In view of the difficulty of distinguishing among certain of the species of *Cuculus* that occur in the Philippines, it seems best to consider this record hypothetical. Rabor himself appears to have rejected his own record, as in a later paper (Rabor, 1952:256) he states that the Common Cuckoo has been recorded only from Basilan, Batan, Calayan, Negros, Palawan, and Siquijor.

Cuculus saturatus horsfieldi Moore, 1857

Rabor collected subadult females on May 2 and 3 and an adult male on May 24, 1964, all at Tambis. These specimens in the USNM constitute the first Leyte record for this migrant.

Cacomantis merulinus merulinus (Scopoli, 1786)

This species was reported to have been collected on Leyte by the Steere Expedition (Steere, 1890:12). The early Philippine literature did not distinguish between *C. merulinus* and *C. variolosus*; only the former is listed, for example, by McGregor (1909). Stresemann (1912) correctly attributed both species to the Philippines, but as late as 1934, Hachisuka (1934:207) synonymized *variolosus* with *merulinus*. Even Delacour and Mayr (1946:107) admitted only *C. v. everetti*, attributed to Basilan and the Sulu Archipelago. It remained for Rand (1951a) to demonstrate that the species *C. variolosus* is actually widely distributed in the Philippines and sympatric with *C. merulinus* (see also Parkes, 1960:334). As subsequent collectors on Leyte have obtained only *C. variolosus*, it is appropriate to conjecture as to whether the alleged *C. merulinus* collected by Steere really belonged to that species. The number of specimens of *Cacomantis* collected on Leyte by the Steere Expedition is not stated, but at least one bona fide *C. merulinus* from Leyte is indeed among the Steere specimens in the BMNH, where its identity was verified for me by I. C. J. Galbraith (letter of February 6, 1973).

Cacomantis variolosus sepulcralis (S. Müller, 1843)

When I discussed this species (Parkes, 1960:334), I was uncertain as to whether Philippine specimens were correctly assigned to *sepulcralis*, described from Java and Sumatra. I have subsequently compared Philippine specimens with a few from Java and the Lesser Sunda Islands, and I find no differences.

There are three Leyte specimens of this species: a juvenile male collected at Patok by Alcasid and Celestino on August 2, 1961 and two USNM specimens taken by Rabor in 1964 (Tambis, May 15, and Ma-alngon, June 6). In addition, one was banded at the MAPS station at Mahaplag in 1964 (McClure and Leelavit, 1972:281).

Chrysococcyx xanthorhynchus amethystinus (Vigors, 1831)

The only Leyte record for this rare cuckoo is a juvenile female collected at Patok by Alcasid and Celestino on August 4, 1961. It conforms well with the description of the young of this species published by Shelley (1891:290).

Surniculus lugubris velutinus Sharpe, 1877

Collected by Rabor 1937, Caliwag, Alcasid and Celestino, and Rabor 1964. The earlier Rabor record was overlooked by Meyer de Schauensee and duPont (1962) in stating that Caliwag's specimen from Dagami was the first from Leyte. Alcasid and Celestino collected eight specimens, which average very slightly glossier (less velvety) than Mindanao and Basilan birds, indicating a tendency toward *S. 1. chalybaeus* Salomonsen, 1953 of Luzon, Mindoro, and Negros. Rabor collected two specimens in 1964 (USNM): Ma-alngon, May 24, and Mount Kabalanti-an, June 19.

***Eudynamys scolopacea mindanensis* (Linné, 1766)**

Collected by Whitehead and by Alcasid and Celestino. The latter collectors took a single young male at Patok on August 3, 1961.

***Centropus viridis viridis* (Scopoli, 1786)**

Collected by Everett, Steere, Rabor 1937, Holder, Alcasid and Celestino, Caliwag, and Rabor 1964. Data on previously unpublished records of this familiar Philippine species are as follows: Palo, adult ♂, October 25, 1945 (Holder); Balinsasayao, July 6, and Patok, July 18, 1961 (both ♂ ♂ in first basic plumage) (Alcasid and Celestino); 1 mile north of Telegrafo, adult ♂, December 18, 1944. The latter specimen was collected by George C. Becker and donated to the AMNH by R. P. Grossenheider. Notes on the label state "Length 17 [inches]. Taken in tall bamboo thicket —edge of swamp. Most frequent call is cuckoo-like, low-pitched 'cuc, cuc,' etc., that carries." Rabor took 24 (9 FMNH, 15 USNM) in the Mount Lobi area in May and nine (1 FMNH, 8 USNM) at Santa Cruz in June, all definitively plumaged adults except for three first-year birds from Santa Cruz.

***Centropus melanops banken* Hachisuka, 1934**

Collected by Steere, Whitehead, Rabor 1937, Alcasid and Celestino, Caliwag, and Rabor 1964. The 10 specimens collected by Alcasid and Celestino and four of the five collected by Caliwag were included in the series I studied in deciding to revive the subspecies *banken* (Parkes, 1971c:13–14). This race is synonymized with *melanops* Lesson, 1830 by duPont (1971:163). Rabor collected 16 specimens at various of his 1964 localities; two are now in the FMNH, two in the DMNH, and the rest in the USNM.

***Centropus bengalensis philippinensis* Mees, 1971**

Collected by Everett and by Bartsch. In pointing out that the name *C. molkenboeri* Bonaparte, 1850 had long been misapplied to this form (the type in Leiden is an example of *C. viridis*), Mees (1971) chose a valid but nevertheless unfortunate substitute name for the Philippine population of the Lesser Coucal; the name *philippensis,* differing only in the lack of the syllable *-in,* appears in the synonymy of both *C. viridis* and *C. sinensis* (Shelley, 1891).

FAMILY **STRIGIDAE** OWLS

Otus bakkamoena everetti **(Tweeddale, 1878)**

The only Leyte specimens of this owl have been collected by Rabor; his 1938 specimen, the first for the island, is no longer extant. In 1964 he collected three adult males, one adult female, and a juvenile female (at Tambis, May 4). One male is in the FMNH, one male in the DMNH, and the rest of the specimens are in the USNM. The FMNH male was compared with three males of *everetti* from Mindanao and matched well except for having a slightly shorter wing: 151 mm. versus 159, 161, 170.

Bubo philippensis mindanensis **(Ogilvie-Grant, 1906)**

The immature male collected by Rabor and destroyed in 1945 was the first Leyte record of this species. Under the name *Pseudotynx* [sic] *philippensis mindanensis,* Rabor (1938) wrote of it that it was much darker than typical *P. p. philippensis.* The species remained uncollected on Leyte until Rabor obtained an adult female (USNM) at Tambis on May 14, 1964. This specimen is a good match in color for a female from Mindanao (and thus very different from the pale nominate race figured by duPont, 1971:173), but it is distinctly smaller-billed. The length (chord from base of bill at skull to bill tip) is 52 mm. versus 58, depth at nostril 28 mm. versus 30, and width at nostril 18 mm. versus 21. This large owl is so rarely collected that it is doubtful whether it will ever be possible to decide whether there is geographic variation within *mindanensis.*

Ninox philippensis philippensis **Bonaparte, 1855**

Collected by Whitehead, Rabor 1937, and Rabor 1964. The adult female and nestling male collected by Rabor in 1937 are no longer extant. I have not examined Whitehead's one specimen, but Ogilvie-Grant (1897:222) stated that it agreed perfectly with Luzon specimens (= *philippensis* topotypes). The Rabor male in the FMNH (Tambis, May 20) is slightly more chocolate-brown, less rufous than four Luzon males that were also collected in the 1960's. Its wing length of 172 falls right in the range of Luzon males (167, 169, 177, 179). Two additional Rabor males in the USNM (Tambis, May 4; Santa Cruz, June 19) have wing lengths of 168 and 169; the USNM lacks Luzon material for color comparisons. The one extant specimen from Samar (actually the satellite island of Buad), a poor skin, also agreed with Luzon material as far as I could tell (Parkes, 1965a:54).

FAMILY **PODARGIDAE** FROGMOUTHS

Batrachostomus septimus septimus **Tweeddale, 1877**

The specimen collected by Rabor in 1937 was the first Leyte record, and he is still the only collector to have obtained this species. He took 10 specimens in the Mount Lobi and Mount Kabalanti-an regions in 1964; of these, six are in the USNM, two in the FMNH, and two in the UMMZ.

FAMILY **CAPRIMULGIDAE** NIGHTJARS

Eurostopodus macrotis macrotis **(Vigors, 1831)**

Rabor collected a pair of Eared Nightjars in 1937, constituting the only Leyte record. He found no appreciable difference between these birds and specimens from Luzon and Mindanao (Rabor, 1938).

Caprimulgus macrurus manillensis **Walden, 1875**

Rabor is the only collector to have taken the Long-tailed Nightjar on Leyte. His 1937 male was destroyed in 1945. On May 25, 1964 he collected another male at Buri, Mount Lobi (USNM). The species is known from Samar only from sight records, which were assigned to *C. m. manillensis* by Rand and Rabor (1960:388). Among Philippine polytypic species that have separate races on Luzon and Mindanao, the populations of Samar and Leyte are sometimes referable to the southern rather than to the Luzon subspecies. Rabor's USNM specimen was compared to a small series of *manillensis,* of which it matched only the darkest extreme. Unfortunately, the USNM has only a juvenile specimen of *C. m. delacouri* Hachisuka, 1931 from Mindanao. The Rabor specimen is here considered to be a dark individual of *manillensis,* but the subspecific identity of Samar and Leyte populations should be reinvestigated if more material becomes available.

FAMILY **APODIDAE** SWIFTS

Collocalia troglodytes **G. R. Gray, 1845**

Collected only by Whitehead.

Collocalia esculenta marginata **Salvadori, 1882**

Two USNM specimens collected by Rabor, a male from Ma-alngon on May 30 and a female from Bulog on June 30, 1964, represent the only Leyte record of this swiftlet.

Cypsiurus batasiensis pallidior **(McGregor, 1905)**

Two females, collected by Holder at Limon on November 4 and 10, 1945 constitute the only Leyte record and form the basis for the inclusion of Leyte in the range of the Palm-Swift by duPont (1971:188). The specimens were originally identified for the University of Arkansas by A. L. Rand in 1952, prior to their exchange to CM.

Brooke (1972) has shown convincingly that the Asian Palm-Swift is not conspecific with the African *C. parvus,* with which it had generally been placed.

FAMILY **HEMIPROCNIDAE** TREE-SWIFTS

Hemiprocne comata major (Hartert, 1895)

Collected by Rabor 1937, Holder, Alcasid and Celestino, Caliwag, and Rabor 1964. Meyer de Schauensee and duPont (1962:157) overlooked Rabor's published record (1938) in stating that Caliwag's three specimens from Dagami were the first for Leyte. Unpublished records include two taken by Holder at Limon on November 4, 1945; four taken by Alcasid and Celestino at Patok on July 25 and 26 and August 4, 1961; a pair taken by Rabor (USNM) at Ma-alngon on May 28, 1964; and one taken on Mount Kabalanti-an, also by Rabor (FMNH), on June 30, 1964. The July 26 specimen taken by Alcasid and Celestino is a female in body molt and is labelled "Breeding."

FAMILY **TROGONIDAE** TROGONS

Harpactes ardens linae Rand and Rabor, 1959

Collected by Whitehead, Bartsch, Rabor 1937, Alcasid and Celestino, Caliwag, and Rabor 1964. The material taken by Alcasid and Celestino consists of eight specimens from Patok and Balinsasayao, collected between July 10 and August 4, 1961. Rabor collected 20 in the Mount Lobi and Mount Kabalanti-an areas; of these, 14 are in the USNM, four in the FMNH, and two in the DMNH.

FAMILY **ALCEDINIDAE** KINGFISHERS

Alcedo atthis bengalensis Gmelin, 1788

Collected only by Everett.

Ceyx argentatus flumenicola Steere, 1890

Collected by Everett, Steere, Rabor 1937, Alcasid and Celestino, and Rabor 1964. In addition, Whitehead (1899:385) saw but did not collect this species on Leyte.

Descriptions in the literature do not mention any difference in dorsal color between *flumenicola* and nominate *argentatus*. The bluish white dorsal feathers, especially the upper tail-coverts, of Samar and Leyte *flumenicola* have a deep, rich blue spot at the base, but this is turquoise in *argentatus* from Mindanao. Measurements of the culmen (from base) presented by Rand and Rabor (1960:338, 390) of Bohol and Samar specimens, plus my own measurements of Leyte birds and those of Leyte and Samar birds in the BMNH kindly made for me by I. C. J. Galbraith, show that individuals with long bills appear to be more frequent in the Leyte population; about 35 per cent of Leyte individuals had bills of 40 mm. or longer, while this bill length is attained by only about 6 per cent of the individuals from the other islands. The mean for Leyte birds, however, is only about 1 mm. greater than that for the Samar specimens.

Alcasid and Celestino collected a single specimen in very worn plumage at Balinsasayao on July 12, 1961. Rabor collected two at Tambis on May 3 and 7 (FMNH) and eight at Santa Cruz from June 14–18 and on July 9, 1964 (2 FMNH, 5 USNM, 1 DMNH).

Ceyx melanurus samarensis **Steere, 1890**

Collected by Steere, Rabor 1937, Alcasid and Celestino, and Rabor 1964. This species appears to be exceptionally individually variable in size, at least in bill length. Rabor (1938) stated that his one Leyte male had a culmen 39 mm. long, whereas a male from Samar measured 30 mm. However, a pair from Samar in CM measure ♂ 37 mm., ♀ 38.5 mm. Three Leyte specimens measured 32.5, 37.5, and 40, with no correlation between size and sex.

Alcasid and Celestino collected a single male at Balinsasayao on July 10. Rabor obtained one specimen at Tambis on May 8 (USNM) and three in the Mount Kabalanti-an area on June 6, 20, and 30 (one each in the USNM, FMNH, and DMNH).

Pelargopsis capensis smithi **(Mearns, 1909)**

Collected by Everett and by Rabor 1937.

Halcyon chloris collaris **(Scopoli, 1786)**

Collected by Everett, Steere, Holder, Bivins, Alcasid and Celestino, Caliwag, and Rabor 1964. Previously unpublished records are as follows:

1 (sex?) 10 miles west of Palo, November 1945 (Bivins)
3 ad., 1 imm., no exact data (vicinity of Tacloban, mid-September to late November 1945) (Holder; two of these specimens are now at LSU)
ad. ♀ July 6, ad. ♂ July 14, 1961, Balinsasayao (Alcasid and Celestino)
ad. ♀ May 3, ad. ♂ May 19, 1964, Tambis (Rabor, USNM)

Halcyon smyrnensis gularis **(Kuhl, 1820)**

Collected by Everett, Holder, Alcasid and Celestino, Caliwag, and Rabor 1964. The Holder specimen, taken 1 mile west of Palo, has label data as follows: "♀ Killed in jungle; eyes dark brn., feet pink; bill reddish brn." Alcasid and Celestino collected a female at Balinsasayao on July 5, 1961. Rabor collected nine for the USNM: an adult on May 18 and stubby-billed juveniles on May 17 and 26 at Mount Lobi and six adults in the Mount Kabalanti-an area from June 13–18. One individual of this species was banded in 1964 and three in 1966 at the MAPS station at Mahaplag (McClure and Leelavit, 1972:281).

Halcyon winchelli nigrorum **Hachisuka, 1934**

Delacour and Mayr (1946:134) listed Leyte in the range of this species, but I know of no Leyte record prior to the single juvenile collected by Alcasid and Celestino at Patok on July 19, 1961. Rabor subsequently took two specimens for the USNM: Ma-alngon, May 28, and Bulog, July 3, 1964.

FAMILY **MEROPIDAE** BEE-EATERS

Merops philippinus philippinus **Linné, 1766**

Collected only by Everett.

Merops viridis americanus **P. L. S. Müller, 1776**

Collected by Everett, Alcasid and Celestino, Caliwag, and Rabor 1964. Alcasid and Celestino collected a male on July 5 and a female on July 10, 1961, both in exceedingly worn plumage. Rabor took an adult male and an immature male on June 23 (USNM) and an adult male on June 28 (FMNH) at Mount Kabalanti-an; these specimens, also, are very worn.

FAMILY **CORACIIDAE** ROLLERS

Eurystomus orientalis cyanocollis **Vieillot, 1819**

Collected by Everett, Steere, Whitehead, Alcasid and Celestino, Caliwag, and Rabor 1964. Alcasid and Celestino took a male in heavy molt at Patok on July 20, 1961. Rabor's 1964 specimens are as follows: adult ♀ (USNM), May 18, on Mount Lobi; and adult ♂ (USNM), adult ♀, first-year ♀ (FMNH), June 15–16, adult ♂ (FMNH), July 5, adult ♀ and ♀ just beginning first prebasic molt (USNM), July 8, all in the Mount Kabalanti-an region.

In an earlier paper (Parkes, 1965a:55) I erroneously stated that the spelling of the subspecific name of this form should be "*cyanicollis*" and not *cyanocollis* as Rand and Rabor (1960) had (correctly) spelled it. This subspecies, as presently constituted, is almost certainly a composite. Study of this species, however, is complicated not only by migration but by major color changes caused by wear. A thorough study with fresh material would probably show that there are as many as four well-differentiated populations within "*cyanocollis*."

FAMILY **BUCEROTIDAE** HORNBILLS

Penelopides panini samarensis **Steere, 1890**

Collected by Everett, Steere, Rabor 1937, Alcasid and Celestino, Caliwag, and Rabor 1964. Whitehead (1899:389) saw but did not collect this species on Leyte. Lint and Stott (1948:45) saw four being prepared for a holiday feast in Baybay, September 21, 1945. Alcasid and Celestino collected five specimens at Balinsasayao from July 6–10 and one at Patok on July 19, 1961; these specimens formed the basis of my discussion of the subspecific identity of the Leyte population of this species (Parkes 1971c:15). Rabor collected nine specimens in the Mount Lobi area between May 4–29 (2 FMNH, 6 USNM, 1 DMNH) and five in the Mount Kabalanti-an area from June 19–July 2, 1964 (2 FMNH, 3 USNM).

***Buceros hydrocorax semigaleatus* Tweeddale, 1878**

Collected by Everett, Steere, Whitehead, Rabor 1937, Alcasid and Celestino, Caliwag, and Rabor 1964. There is also a sight record by Lint and Stott (1948:45) of two seen on October 2, 1945 "in the mountains between Ormoc and Burauen." Alcasid and Celestino collected adult females on July 27 and August 1 at Patok, and a juvenile female on July 13 at Balinsasayao. Rabor collected five specimens each in the Mount Lobi and Mount Kabalanti-an areas from May 4–July 6 (6 USNM, 4 FMNH).

FAMILY **CAPITONIDAE** BARBETS

***Megalaima haemacephala celestinoi* Gilliard, 1949**

Collected by Steere, Whitehead, Alcasid and Celestino, Caliwag, and Rabor 1964. Alcasid and Celestino collected four adults and a juvenile at Balinsasayao, July 10–15, 1961. Rabor collected adults at Buri on May 25 and 31 for the FMNH and at Buri on May 25 and Paniniklan on June 26 for the USNM.

When I reviewed geographic variation in this species (Parkes, 1960:336), I had seen only the single specimen each from Samar and Leyte on which *celestinoi* was based. Gilliard (1949) stated that *celestinoi* differed from *haemacephala* of Luzon only in size; I suggested that the small size differences "might disappear if larger series were measured." The four Leyte adults collected by Alcasid and Celestino fulfilled this prediction; the size difference between the two races is an average rather than an absolute one.

The additional material of *celestinoi* shows an overlooked color character, a decided wash of blue on the edges of primaries and secondaries and a bluer tinge to the green of the rectrices than in *haemacephala*. The lower flanks and under tail-coverts are more heavily washed with yellow in *celestinoi;* the dorsum is somewhat darker and of a bluer, less pure green. Moreover, the blue area of the nape is darker and extends farther posteriorly. On the other hand, the color of the ventral streaks is not as distinctive a character as I had thought earlier. In my 1960 paper, I synonymized *mindanensis* Rand, 1948 with *haemacephala*. After examining additional material, I now find that the deeper yellow throat of *minda-*

nensis is sufficiently consistent to warrant recognition of the subspecies, but none of the other characters ascribed to it hold up in series. As I wrote in 1960, *celestinoi* is a much more strongly differentiated subspecies.

The descriptions of the subspecies of *Megalaima haemacephala* given by duPont (1971:213, 216) are based on the above notes, which were supplied to Dr. duPont while his book was in manuscript.

FAMILY **PICIDAE** WOODPECKERS

Mulleripicus funebris fuliginosus **Tweeddale, 1877**

Collected by Whitehead, Rabor 1937, Alcasid and Celestino, Caliwag, and Rabor 1964. Alcasid and Celestino collected two pairs at Patok on August 10, 1961, and Rabor took a single male (USNM) at Buri on May 27, 1964.

The type locality of *fuliginosus* is Surigao, Mindanao. Specimens from Samar and Leyte are identical to those from Mindanao except for a tendency to have the bill dark at the base rather than entirely ivory. DuPont (1971:217) states that this race lacks red on the head except for the malar region of males. This is true in general, but scattered red feathers in the frontal and loral regions are not uncommon in both sexes.

Dryocopus javensis pectoralis **(Tweeddale, 1878)**

Collected by Everett, Steere, Whitehead, Rabor 1937, Alcasid and Celestino, Caliwag, and Rabor 1964. At their two localities in 1961, Alcasid and Celestino collected eight specimens between July 10 and August 2, of which three are juveniles and two are year-old birds. Rabor collected two specimens for the USNM; a first-year female at Tambis on May 17 and an adult male at Paniniklan on July 3.

Dendrocopos maculatus leytensis **(Steere, 1890)**

Collected by Steere, Whitehead, Alcasid and Celestino, and Rabor 1964. Alcasid and Celestino obtained a single specimen at Patok on July 25, and Rabor took four (2 FMNH, 2 USNM) in the Mount Lobi region from May 11–28.

The cinnamon tinge of the forehead and nasal plumes mentioned in the otherwise highly inadequate original description of *leytensis* is quite evident in adult specimens I have examined; such a color is present in some specimens of *D. m. fulvifasciatus* (Hargitt, 1881) of Basilan and Mindanao, but in these it is darker and less contrasted with the black of the crown.

Chrysocolaptes lucidus rufopunctatus **Hargitt, 1889**

Collected by Steere, Whitehead, Rabor 1937, Alcasid and Celestino, Caliwag, and Rabor 1964. Alcasid and Celestino collected seven specimens at Patok and Balinsasayao between July 18 and August 6. Rabor collected six specimens in the Mount Lobi area, May 13–29, and four in the Mount Kabalanti-an area, June 14–July 6. One specimen from each area is in the FMNH; the rest are in the USNM.

Samar and Leyte specimens are identical; the type locality, Panaon, is a satellite island at the southern tip of Leyte.

FAMILY **EURYLAIMIDAE** BROADBILLS

Eurylaimus steerii samarensis **(Steere, 1890)**

Collected by Whitehead, Alcasid and Celestino, Caliwag, and Rabor 1964. Alcasid and Celestino obtained a fine series of 12 specimens at Patok, July 24–August 9. Rabor collected two at Buri for the USNM, May 27 and 28. This species shows a decided color change with museum age. Samar and Leyte specimens in the AMNH taken in 1886 and 1896 are much paler, more raspberry colored and less purplish above than Samar specimens from 1957 and Leyte specimens from 1961.

FAMILY **PITTIDAE** PITTAS

Pitta erythrogaster erythrogaster **Temminck, 1823**

The first Leyte specimen of this species was collected by K. W. Prescott when it flew aboard a naval vessel anchored 2–4 miles offshore in Leyte Gulf on July 4, 1945. When I called Prescott's attention to the importance of this specimen (which is now in the UMMZ), I knew of no specimen from Leyte itself, and Prescott's paper (1973) is thus accurately titled "First report of Pitta e. erythrogaster from Leyte." There is, however, one specimen taken on land—by Rabor at Tambis on May 8, 1964 (USNM)—unknown to me when I wrote Prescott.

This species is clearly migratory within the Philippines. Large numbers are obtained at Dalton Pass, Nueva Vizcaya, Luzon, a well-known concentration point for migratory birds; 1885 were banded there in the period 1964–1970 (McClure and Leelavit, 1972:261). USNM specimen no. 233444 from Manila Bay, Luzon, November 1908, bears the following label notes by the collector, Theodore W. Richards: "This bird and several others of same flew into ship search light while U. S. S. Kansas was engaged in night target practice." This is an interesting historical precedent for Prescott's Leyte Gulf record.

Pitta sordida sordida **(P. L. S. Müller, 1776)**

This widely distributed Philippine species is known from Leyte only through a sight record by Rabor (1938).

Pitta steerii coelestis **Parkes, 1971**

This species was originally known from Leyte only from a female in first prebasic molt collected by Alcasid and Celestino at Patok on July 28, 1961. It was among the specimens examined during the preparation of the original description of *coelestis* (Parkes, 1971b). Rabor subsequently collected a specimen at Buri on June 6 (FMNH) and one each at Ma-alngon on June 5 and Bulog on July 5 (both USNM). The USNM specimens are worn and do not show the characters of *coelestis* well.

FAMILY **HIRUNDINIDAE** SWALLOWS

Hirundo rustica gutturalis **Scopoli, 1786**

Oddly enough, this Palaearctic species, an abundant winter visitor to the Philippines, has been collected on Leyte only by Holder. He collected two specimens at Tacloban on September 28, 1945, of which one is referable to this, the common wintering subspecies in the Philippines, and the other to the next form.

Hirundo rustica saturata **Ridgway, 1883**

One specimen, collected by Holder at Tacloban on September 28, 1945. For a discussion of the taxonomy and nomenclature of Barn Swallows wintering in the Philippines, see Parkes, 1971c:18.

Hirundo tahitica javanica **Sparrman, 1789**

Hirundo javanica Sparrman, Mus. Carlsonianum, fasc. 4, no. 3, 1789: pl. 100 (Java).

Collected only by Everett. Both Peters (1960:108) and duPont (1971:233) used the name *H. j. abbotti* (Oberholser, 1917), the type locality of which is Pulo Manguan in the Anamba Islands, for the Philippine population of the Pacific Swallow. As stated earlier (Parkes, 1971c:19), I cannot separate Philippine examples from those from Java and therefore use the earliest available name, as above.

FAMILY **CAMPEPHAGIDAE** CUCKOOSHRIKES

Coracina striata boholensis **Rand and Rabor, 1959**

Collected by Whitehead, Rabor 1937, Alcasid and Celestino, Caliwag, and Rabor 1964. Alcasid and Celestino obtained an exceedingly useful series of 18 specimens, which illustrate a number of age/sex/molt variations. Rabor collected nine in the Mount Lobi region and eight in the Mount Kabalanti-an region (2+4 FMNH, 7+4 USNM). Among these are two females taken on May 16 (USNM) and May 17 (FMNH) in the very rarely collected full juvenal plumage.

Meyer de Schauensee and duPont (1962:160) assigned their eight Caliwag specimens to *boholensis* without having made direct comparisons with Bohol birds. Their identification was correct, but they relied on the character of closeness of barring of the underparts given in the original description of *boholensis*. As I have previously indicated (Parkes, 1971c:19), this character is not consistent and is not the best character for distinguishing *boholensis* from *kochii* of Mindanao (with which Leyte birds had been identified before Rand and Rabor described *boholensis*).

Coracina morio ripleyi Parkes, 1971

Collected by Alcasid and Celestino, Caliwag, and Rabor 1964. One of the three specimens collected at Patok by Alcasid and Celestino was selected as holotype of this subspecies; I also examined the three Leyte birds taken by Caliwag preparatory to the description of *ripleyi* (Parkes, 1971c:21). I have subsequently seen the single specimen collected by Rabor at Paniniklan on June 25, 1964.

Lalage melanoleuca minor (Steere, 1890)

Collected by Whitehead and by Rabor 1964. Rabor's series, all in the USNM, consists of an adult male from Tambis, May 20; a subadult male from Paniniklan, June 25; and an adult male and female from the same locality, June 26.

Lalage nigra chilensis (Meyen, 1834)

Collected by Everett, Holder, Alcasid and Celestino, and Caliwag. Holder's specimen was taken at Tacloban on October 30, 1945 and that of Alcasid and Celestino at Balinsasayao on July 7, 1961.

This subspecies occupies a range including the entire Philippine archipelago and Borneo. Within this area I have been able to detect no geographic variation in color. There is one size trend, a north to south increase in bill size, manifested especially in width (measured at the nostrils). Using males only, eight from Luzon averaged 5.81 mm. in this dimension; seven from main islands south of Luzon (Leyte, Negros, Mindanao, and Basilan) averaged 6.29 mm.; three from the Sulus averaged 6.33; and one from Borneo measured 7 mm. There is insufficient basis here for any subdivision of *chilensis*.

Pericrocotus flammeus leytensis Steere, 1890

Collected by Steere, Whitehead, Alcasid and Celestino, and Rabor 1964; sight record published by Rabor (1938). Alcasid and Celestino collected one adult male, one year-old male, one male just completing its first prebasic molt, and three adult females, all between July 4 and August 4, 1961. Rabor collected two for the FMNH on Mount Kabalanti-an: a male on June 20 and a female on July 4. For the USNM he collected a pair in the same area on June 22 and, in the Mount Lobi area, a female on May 20 and a male in first prebasic molt, with much juvenal feathering remaining, on May 30.

FAMILY **DICRURIDAE** DRONGOS

***Dicrurus hottentottus samarensis* Vaurie, 1947**

Collected by Steere, Bartsch, Rabor 1937, Alcasid and Celestino, Caliwag, and Rabor 1964. Meyer de Schauensee and duPont (1962) listed Caliwag's Leyte specimens under the name *striatus* Tweeddale, 1877. Only two of these had measurable tails; these were 96 and 97 mm. long. These measurements accord well with my figures (Parkes, 1971c:24) of 90–99.5 mm. for *samarensis,* with a range of 100–111.5 mm. for *striatus.* Tails of 12 measurable adults from Rabor's Leyte collection in the FMNH, not seen prior to my 1971 paper, ranged between 89 and 99 mm.

Alcasid and Celestino collected an excellent series of 15 specimens of this drongo, and Rabor obtained 16 for the FMNH. Six of this combined series are immatures in which no spangled feathers have yet appeared (males—May 12, June 1, and July 4, 7, and 24; female—July 28). Vaurie (1949:280) states that in many forms of the *Dicrurus hottentottus* superspecies the immature birds have the axillary feathers tipped with white. That this is not a useful age character in *samarensis* is shown by the fact that only two of the six young birds mentioned show even a single white spot on an axillar feather. The 32 USNM specimens collected by Rabor are all adults (spangled) except for one unsexed stub-tailed juvenile from Tambis, collected on May 22.

FAMILY **ORIOLIDAE** ORIOLES

***Oriolus xanthonotus samarensis* Steere, 1890**

Collected by Whitehead, Rabor 1937, Alcasid and Celestino, and Rabor 1964. Alcasid and Celestino obtained a series of 12 specimens from Patok and Balinsasayao between July 6 and August 12. Rabor's series of 11 (8 USNM, 3 FMNH) from Mount Lobi and Mount Kabalanti-an, taken between May 16 and July 4, are mostly worn and stained, but some had begun the prebasic molt.

Rand and Rabor (1960:362) stated that *samarensis* and *O. x. basilanicus* Ogilvie-Grant, 1896 were similar except for the color of the inner webs of the wing quills. The more complete analysis of the differences between these races published by duPont (1971:249) was based on my study.

Rand and Rabor (1960:307, 362) assigned a specimen from Mount Malindang, at the base of the Zamboanga Peninsula of western Mindanao, tentatively to *O. x. basilanicus,* and a specimen from "eastern

Mindanao" (locality not specified) to *samarensis*. DuPont (1971:248–249) followed this separation, assigning *basilanicus* to western Mindanao and *samarensis* to eastern Mindanao. I have not examined specimens from easternmost Mindanao, where populations indistinguishable from *samarensis* may occur, but I can state that the influence of *basilanicus* extends well into central Mindanao. A specimen from Iligan City, across Iligan Bay (= east) from the Zamboanga Peninsula, is typical *basilanicus*. A series of six specimens from Mount Katanglad, north-central Mindanao, is intermediate but somewhat closer to *basilanicus*. Four specimens from Tupi, Cotabato Province, southern Mindanao, are nearest *basilanicus* in all characters, being only faintly less gray on the primary edgings and yellower on the underside of the wing.

Oriolus chinensis yamamurae **Kuroda, 1927**

Collected by Everett, Steere, Celestino, Rabor 1937, Holder, Alcasid and Celestino, Caliwag, and Rabor 1964. One was banded at the MAPS station at Mahaplag in 1964 (McClure and Leelavit, 1972:281). One of the five specimens collected by Holder at Tacloban and vicinity has been exchanged to the University of Connecticut. Alcasid and Celestino took four at Balinsasayao from July 6–10 and two at Patok on August 12 and 22. Rabor collected 34 in the Mount Lobi and Mount Kabalanti-an regions (20 USNM, 14 FMNH) between May 3 and July 19. Of these, all are adults except for three USNM specimens: a stub-tailed juvenile male from Tambis (May 6) and two full-grown juvenile females from Malinao (July 8).

DuPont (1971:250–251) unites all Philippine populations of this oriole under the name *O. c. chinensis* Linné, 1766. I prefer to recognize three subspecies, as explained in an earlier paper (Parkes, 1965a:62–64). Leyte birds match those from Basilan, type locality of *yamamurae*.

FAMILY **CORVIDAE** CROWS

Corvus macrorhynchos philippinus **(Bonaparte, 1853)**

Collected by Everett (record overlooked by McGregor, 1909), Celestino, Holder, and Rabor 1964. Holder took a male at Tacloban on October 27, 1945, and Rabor took a pair for the USNM at Santa Cruz on July 9, 1964.

FAMILY **SITTIDAE** NUTHATCHES

Sitta frontalis lilacea **(Whitehead, 1897)**

Collected by Whitehead, Rabor 1937, and Rabor 1964. There is no published record as to how many specimens of this nuthatch Whitehead collected on Leyte. I have seen three of his specimens in the AMNH, plus those collected by Rabor in the Mount Lobi and Mount Kabalanti-an areas (4 USNM, 4 FMNH), May 15–19 and 27, June 4, and July 1, 1964.

Delacour and Mayr (1946:219–220) considered as "doubtfully distinct from *lilacea*" the races *apo* (Hachisuka, 1930; Mindanao), *insignis* (Hachisuka, 1930; Negros), and *cebuensis* (Hachisuka, 1930; Cebu). Use of the name "*lilacea*" in the above context was an obvious *lapsus,* as they had, in the same account, already attributed the Cebu and Negros populations to *S. f.* "*aenochlamys*" [= *oenochlamys*] (Sharpe, 1877). Both Greenway (1967:143) and duPont (1971:257) agree in synonymizing *insignis* and *cebuensis* with *oenochlamys.*

In examining the Samar and Leyte specimens in the AMNH, I had occasion to look into the validity of *apo* and of *zamboanga* Rand and Rabor, 1957, which was described after the publication of Delacour and Mayr's book. Rand and Rabor (1960:434–435) reviewed the Philippine subspecies of this nuthatch, but my findings differ from theirs in several respects. My measurements support theirs in indicating that both *apo* and *zamboanga* have somewhat longer wings than *lilacea.* In color, however, I find both of these races much less distinct than stated by Rand and Rabor. According to these authors, the upperparts of *apo* were more like those of Negros specimens of "*aenochlamys*" than those of Samar *lilacea* (i.e., had less lilac on the foreback), while the underparts of *apo* were said to be paler than those of *lilacea* (but said to be *darker* than *lilacea* by duPont, 1971). I find that some specimens of *apo* are fully as dark as *lilacea,* and that the *only* consistent color difference lies in *lilacea*'s having a slight trace of blue below the eye, lacking in *apo.* As for *zamboanga,* said by its describers to be the darkest subspecies, I find this, too, to be a weak race. The five Zamboanga specimens in the AMNH have underparts darker than most (all except the darkest) *apo*; but, contrary to Rand and Rabor, they are no darker below than *lilacea.* The upperparts, too, are *slightly* darker than *apo,* but there is no consistently "greater amount of lilac wash on hind neck and foreback." The only consistent difference between *zamboanga* and *lilacea* (other than the slightly larger size of the former) is the presence in *lilacea* of a blue spot below the eye. There is no size difference between *apo* and *zamboanga*; these two forms differ *only* in the somewhat darker average color of the latter. The descriptions of the various races given by duPont (1971) should be adjusted accordingly.

FAMILY **RHABDORNITHIDAE** PHILIPPINE CREEPERS

Rhabdornis mysticalis minor **Ogilvie-Grant, 1896**

Collected by Steere, Whitehead, Alcasid and Celestino, Caliwag, and Rabor 1964. Alcasid and Celestino obtained three specimens: a female on

July 10 at Balinsasayao, labelled "breeding," a male on July 13 at Balinsasayao, and a male on August 8 at Patok. Rabor took 16 in the Mount Lobi and Mount Kabalanti-an areas (7 FMNH, 9 USNM) between May 7 and July 17.

Rhabdornis inornatus subsp.

The first report of this species on Leyte was published by Ripley and Rabor (1968:35), based on Rabor's 1964 collections, but the first Leyte specimens were the two taken at Patok by Alcasid and Celestino on July 23 and August 7, 1961. Ripley and Rabor stated that their Leyte series agreed in size and color with *R. inornatus inornatus* from Samar. Six of Rabor's 1964 specimens are in the FMNH, where I compared them with 18 specimens from Samar. Although it is true that there is no size difference between Leyte and Samar birds, they are readily separable in a number of color characters. The Leyte race may be called:

Rhabdornis inornatus leytensis new subspecies

Type FMNH 276532, adult ♀, collected at Tambis, Burauen (Mount Lobi range), Leyte, Philippines, on May 3, 1964, by D. S. Rabor (collector's no. 41802).

DIAGNOSIS: Nearest *R. i. inornatus* of Samar, but crown somewhat paler gray; brown of dorsum slightly less intense; black facial mask less extensive, not including the lores, which are gray like the crown; posterior edge of facial mask breaking into brown and white, not black and white longitudinal streaks; light supraocular line less contrasting and not extending forward of eye, whereas in *inornatus* it forms the upper margin of the black loral extension of the facial mask; lesser wing-coverts (which have white shaft streaks in both races) brown to dark brown rather than blackish brown to black; cinnamon-buff of under wing-coverts and inner margins of primaries distinctly paler.

RANGE: Island of Leyte, Philippines.

ETYMOLOGY: Named for the island it inhabits.

SPECIMENS EXAMINED (total): *R. i. inornatus*, Samar, 23; *R. i. leytensis*, Leyte, 21 (the series of 13 Rabor specimens in the USNM was not directly compared with Samar specimens, but they matched the preceding description, which was based on the FMNH material). Also, series in the AMNH and FMNH of the much larger *grandis* of Luzon and the very gray *rabori* of Negros.

FAMILY **TIMALIIDAE** BABBLERS

Ptilocichla mindanensis minuta Bourns and Worcester, 1894

Collected by Whitehead, Rabor 1937, Alcasid and Celestino, and Rabor 1964. Alcasid and Celestino took a female at Balinsasayao on July

12. Rabor collected seven at various localities between May 4 and July 3 (5 USNM, 2 FMNH). As stated by Rabor (1938), Leyte specimens are indistinguishable from those from Samar. A nestling from Samar (AMNH 589259), when compared with one of similar age from Mount Matutum, Cotabato, Mindanao (AMNH 708669), shows that the color differences between *minuta* and *mindanensis* are evident even in juvenal plumage.

Current literature assigns all of Mindanao to the nominate race and confines *basilanica* Steere, 1890 to the island of Basilan. Two specimens from Mount Sugarloaf, in the eastern part of the Zamboanga Peninsula of western Mindanao (AMNH), are intermediate between six *mindanensis* from Cotabato Province and eight *basilanica* from Basilan. The tail of *basilanica* is brown, that of *mindanensis* black, and that of the Mount Sugarloaf birds intermediate in color. The latter also approach *basilanica* in their generally ruddier color, with ventral streaking less black than in *mindanensis.* They show no indication of the light dorsal streaks of *basilanica.* It is quite possible that Streaked Ground-Babblers from farther west on the Zamboanga Peninsula might be referable to *basilanica.*

Stachyris plateni pygmaea (Ogilvie-Grant, 1896)

The four specimens collected by Whitehead constituted the only Leyte record of this species until 1964, when Rabor took one at Tambis on May 13 (FMNH), two at Tambis on May 14 (USNM), and two at Mount Kabalanti-an on June 21 and 24 (FMNH). The FMNH specimens do not differ from a long series from Samar in that museum.

Stachyris capitalis nigrocapitata (Steere, 1890)

Collected by Steere, Whitehead, Alcasid and Celestino, and Rabor 1964. I have already shown (Parkes, 1963) that the inclusion of "southern Leyte" in the range of *S. c. capitalis* (Tweeddale, 1877) by Delacour and Mayr (1946) and other authors was based on an Everett specimen misidentified by Tweeddale (1878:342); the alleged Leyte specimen of *capitalis* is in fact an example of *Macronous striaticeps.* Attribution of *S. c. nigrocapitata* to "Northern Leyte" (Delacour and Mayr, 1946) rests part on the supposed presence of *S. c. capitalis* in southern Leyte. There is no reason to suppose that *S. c. nigrocapitata* does not occur throughout Leyte in proper habitat.

Unpublished records include a specimen taken at Balinsasayao on July 13, 1961, by Alcasid and Celestino; the same collectors obtained a "nesting" adult female and two juveniles at Patok on July 26. Rabor collected specimens in the Mount Lobi area on May 13 and 25 (USNM) and at Mount Kabalanti-an on June 3, 24, and 25 and on July 1 (two). Of the latter, three are in the FMNH and two in the USNM.

Macronous striaticeps mindanensis **Steere, 1890**

Collected by Everett (the specimen mistakenly reported as *Stachyris c. capitalis*), Steere, Whitehead, Alcasid and Celestino, Caliwag, and Rabor 1964. In addition, one was banded at the MAPS station at Mahaplag in 1964 (McClure and Leelavit, 1972:281).

The seven specimens taken by Caliwag were erroneously reported as the first for Leyte by Meyer de Schauensee and duPont (1962:164) under the name "*cummingi*" [= *cumingi*] Hachisuka, 1934. In an earlier paper (Parkes, 1965a:58–60), I synonymized *cumingi* with *mindanensis*, but recognized *mearnsi* Deignan, 1951 as a race of the Mindanao highlands and *boholensis* Hachisuka, 1930 as a weakly characterized race endemic to Bohol. I have subsequently examined the series of specimens from Samar, Leyte, and highland and lowland Mindanao at the DMNH. Although all of the trends mentioned in my 1965 paper are present in this material, I feel that no great disservice is done by placing all of these names in the synonymy of *mindanensis*, as has been done by duPont (1971:269).

Alcasid and Celestino's unpublished material consists of 11 specimens collected at Balinsasayao and Patok between July 10 and August 2, 1961. Rabor collected no less than 72 (48 USNM, 24 FMNH) at virtually all of his collecting localities between May 2 and July 8, 1964.

Micromacronus leytensis leytensis **Amadon, 1962**

The type series of this striking and unexpected new genus and species was collected by Alcasid and Celestino at Patok on August 11, 1961. A duller and slightly larger subspecies was subsequently described from Mount Matutum, Cotabato Province, Mindanao, by Ripley and Rabor (1968).

When studying the Alcasid and Celestino collection at the AMNH, I paid special attention to *Micromacronus*, as two of the four specimens were to be returned to the PNM. It should be said at the outset that the color reproduction of the plate accompanying the original description (Amadon, 1962a) is very misleading. The specimens are of a much richer, more brilliant yellow (less greenish), especially on the underparts, than is indicated by the plate.

Amadon stated that the relationships of *Micromacronus* would have been difficult to ascertain but for the *Macronous*-like specialized plumes of the back and sides. He thought it probable that it would have been considered a leaf-warbler (= *Phylloscopus*). Ripley and Rabor (1968) went so far as to say, "Perhaps only the specialized feathers prevent it from being thought of as a uniquely plumaged leaf-bird (Aegithinidae)." My studies of the type series indicate that Amadon was perfectly correct in his original assignment of *Micromacronus* to the babblers, adjacent to *Macronous* (= *Macronus* of Amadon's usage). Although Amadon stated accurately that only *M. ptilosus* among *Macronous* species has specialized plumes on the "sides" (= flanks) as well as on the back, there is also a *tendency* toward such specialization (the elongate and filamentous condition) in the Philippine species *M. striaticeps,* especially noticeable in the nominate race from Basilan (see plate 58 in duPont, 1971).

In *Macronous ptilosus* the juvenile has a pale bill (at least the lower mandible and the tip of the upper), as in reference specimen AMNH 590553, Deli, Sumatra, May 11, 1917. The rest of the AMNH series of this species suggests that remnants of bill paleness may indicate immaturity (= first-year birds). The two males of *Micromacronus leytensis* marked on labels as having had enlarged testes both have solidly black bills. The other male (which is not annotated as to testis size) and the female both have the lower mandible pale, although this is not mentioned in Amadon's description nor shown on Singer's accompanying plate. After having described the plumage color differences shown by the one female, Amadon stated, "Mr. H. G. Deignan pointed out to me that inasmuch as the sexes are usually alike in babblers, it is possible that the differences just noted indicate immaturity rather than sex." However, both of the pale-mandibled birds are molting out of a plumage that was very whitish on face and underparts, but the individual sexed as male has incoming feathers that are much brighter (underparts) than the equivalent incoming feathers of the female—fully as bright, in fact, as those of the adult males. The female (whose molt is further advanced) is assuming a duller yellow, buffy-faced plumage, with enough traces left of the previous plumage to show that it resembled that of the male. A few dorsal feathers and tertials that remain indicate that the juvenal plumage is probably rather grayish or brownish dorsally, not greenish. Sexual dimorphism, then, does indeed exist in *Micromacronus l. leytensis,* as early as the first basic plumage. These findings on the color of the juvenal plumage and the sexual dimorphism were later confirmed by Ripley and Rabor (1968) for *M. l. sordidus,* the type series of which includes one juvenile. These authors state that the bill of *sordidus* is pale at the base rather than all black. This appears to be a subspecific character, although it is conceivable that the type series of five *sordidus* (other than the juvenile) might all have been first-year birds.

It is noteworthy that neither Caliwag nor Rabor, who visited the Mount Lobi area after Alcasid and Celestino had collected the type series of four out of a flock of about 10, were able to find *Micromacronus leytensis.*

FAMILY **PYCNONOTIDAE** BULBULS

Pycnonotus urostictus atricaudatus **Parkes, 1967**

Collected by Steere, Whitehead (*fide* McGregor [1909], but Ogilvie-Grant [1897], in reporting on Whitehead's Samar and Leyte collections, does not specify on which island or islands this species was obtained), Alcasid and Celestino, Caliwag, and Rabor 1964. Rabor (1938) also published a sight record, and Lint and Stott (1948) published a nesting record from San Roque, Leyte, in March 1946.

The six specimens collected by Alcasid and Celestino at Patok between July 18 and August 12, 1961 formed part of the series upon which this subspecies was described. Other unpublished material is that of Rabor, who took 17 at Tambis from May 11–27 (6 FMNH, 11 USNM), plus one each at Buri, Santa Cruz, and Bulog (all USNM).

Pycnonotus goiavier samarensis Rand and Rabor, 1960

Collected by Everett, Steere (overlooked by McGregor [1909]), Whitehead, Bartsch, Rabor 1937, Alcasid and Celestino, Caliwag, and Rabor 1964. Leyte was inadvertently omitted from the range of this subspecies by duPont (1971:278), although Caliwag's specimens were correctly attributed to *samarensis* by Meyer de Schauensee and duPont (1962:163, where the species name is given as "*goiaver*"). For a full discussion of the characters of this subspecies, see Parkes, 1965a:56. Alcasid and Celestino collected an adult female and male at Balinsasayao on July 13 and 14, 1961. Rabor took 52 specimens (17 FMNH, 35 USNM) at Tambis in May 1964, and four at Santa Cruz (3 FMNH, 1 USNM) from June 15–20.

Hypsipetes philippinus saturatior (Hartert, 1916)

Collected by Everett, Steere, Bartsch, Rabor 1937, Holder, Alcasid and Celestino, Caliwag, and Rabor 1964. In addition, 12 were banded in 1964 and 21 in 1966 at the MAPS station at Mahaplag (McClure and Leelavit, 1972:281).

Unpublished Leyte records include two collected by Holder 1 mile west of Palo on November 3, 1945; four collected by Alcasid and Celestino at Balinsasayao on July 8 and 10 and at Patok on August 5 (juvenile) and 9, 1961; and 57 taken by Rabor at his various 1964 collecting localities (20 FMNH, 37 USNM), of which a May 4 specimen from Tambis and a June 18 specimen from Santa Cruz, June 18, are juveniles.

This subspecies was synonymized with *H. p. philippinus* (J. R. Forster, 1795) by duPont (1971:279), but for reasons presented in an earlier paper (Parkes, 1965a:57), I recognize it as distinct. Although the subspecies was described from eastern Mindanao, its characters are most fully developed in the Leyte population.

Hypsipetes everetti everetti (Tweeddale, 1877)

Collected by Steere, Whitehead, Rabor 1937, Alcasid and Celestino, Caliwag, and Rabor 1964. The abundance of this species in the Mount Lobi area is indicated by the series obtained by recent collectors. Caliwag took 21 (Meyer de Schauensee and duPont, 1962:163); Alcasid and Celestino took 26 (plus one at Balinsasayao), and Rabor took 30 (21 USNM, 9 FMNH). Rabor also collected 17 in the Mount Kabalanti-an area (9 USNM, 8 FMNH).

Rand and Rabor (1959) separated the Samar population of this species as *H. æ. samarensis* and guessed that Leyte birds would probably belong to their new race. They reviewed the species again in 1969 and added Leyte to the range of *samarensis* without comment. Under *H. e. everetti* in this 1969 paper, Rand and Rabor state, "There is considerable variation in Mindanao birds, and this results in an overlap with Samar and Leyte series." The extent and origin of their Mindanao material is listed in neither the 1959 nor the 1969 paper. The type locality of *everetti* is Surigao, at the northeastern tip of Mindanao. Examination of the superb series of 110 specimens in the DMNH from various localities in Mindanao, Siargao (a large satellite island off Surigao), Dinagat (between Surigao and Leyte), Samar, and Leyte clearly shows that *samarensis* cannot be upheld. Individual variation within samples from single localities from each of these islands more than encompasses the alleged difference between "*samarensis*" and *everetti*. Additional comparisons were made at the USNM between 30 Leyte specimens and 20 recently collected Mindanao birds, and the same range of individual, nongeographic variation was found. I therefore consider *samarensis* Rand and Rabor, 1959 as a synonym of *everetti* (Tweeddale, 1877).

FAMILY **IRENIDAE** LEAFBIRDS, FAIRY-BLUEBIRDS

Chloropsis flavipennis (Tweeddale, 1878)

Collected by Alcasid and Celestino, Caliwag, and Rabor 1964. Meyer de Schauensee and duPont (1962:162) listed Caliwag's one Mount Lobi specimen as the first from Leyte, as they did not know of the three collected in the same area somewhat earlier in 1961 by Alcasid and Celestino. Furthermore, Ripley and Rabor (1968), in announcing Rabor's discovery of this species on Leyte, overlooked the record published by Meyer de Schauensee and duPont.

Ripley and Rabor (1968) concluded that Leyte birds linked those of Cebu (*flavipennis*) with those of Mindanao (*mindanensis* Salomonsen, 1953) to the extent that recognition of any subspecies was not practicable. I had already come to the same conclusion independently, using the AMNH and CM material. Rabor's USNM series consists of three specimens from Ma-alngon, Mount Lobi (May 28 and 30 [two]) and one from Paniniklan, Mount Kabalanti-an (June 28).

Irena cyanogaster ellae **Steere, 1890**

Collected by Steere, Whitehead (specimens molting, discarded), Rabor 1937, Alcasid and Celestino, and Rabor 1964. Alcasid and Celestino's series from Balinsasayao includes an adult ♂ (July 15), an adult ♀ (July 22), and a pair with a stub-tailed juvenile (August 5). Rabor's series from his two general collecting areas consists of 27 adults (17 USNM, 10 FMNH) taken between May 2 and July 6, 1964.

This subspecies was described from Samar; I find no differences between Samar specimens and those from Leyte.

I take this opportunity to state that I place *Irena* (the fairy-bluebirds) here only for the reason of convenience in coordinating this paper with duPont (1971). I believe Wetmore (1960:19) to be correct in dissociating the fairy-bluebirds from the leafbirds. The latter take the name Chloropseidae; Wetmore tentatively places *Irena* in its own subfamily of the Oriolidae.

FAMILY **TURDIDAE** THRUSHES

Copsychus saularis mindanensis **(Boddaert, 1783)**

Collected only by Everett. Leyte was inadvertently omitted from the range of this form by duPont (1971:295). Although I have not examined any Leyte specimens, assignment to the subspecies *mindanensis* is logical, as it is found on the surrounding islands. The only other Philippine race of the species, *C. s. deuteronymus* Parkes, 1963, appears to be a Luzon endemic (Parkes, 1962b).

Monticola solitarius philippensis **(P. L. S. Müller, 1776)**

This migrant has been collected on Leyte only by Everett and by Steere.

FAMILY **SYLVIIDAE** OLD WORLD WARBLERS

Megalurus palustris forbesi **Bangs, 1919**

This large, conspicuous, noisy, and widely distributed species has, surprisingly, been collected only twice on Leyte, both times by Rabor. His single 1937 female was destroyed in 1945, leaving the very worn adult male from Santa Cruz (USNM), taken June 16, 1964, as the only Leyte specimen. Grassland species are, in general, poorly represented in Leyte collections, as most collectors have concentrated on highland areas and forest birds.

Megalurus timoriensis alopex **Parkes, 1970**

Collected by Holder, Alcasid and Celestino, and Rabor 1964. Holder's specimen, taken at the Tacloban airstrip on November 27, 1945, is the holotype of this recently described subspecies. Alcasid and Celestino also obtained only one specimen. Rabor collected two at Tambis for the USNM: one unsexed bird on May 18 and one adult male on May 20, 1964. The May 18 bird is worn and faded, but the May 20 bird has a number of fresh feathers that show the rufescence typical of this race. They also have the short bills (16, 17 mm.) described for *alopex,* but it is not possible to verify the short tail of *alopex,* as most of the rectrices are missing from both specimens.

Cisticola juncidis tinnabulans **(Swinhoe, 1859)**

A male collected by Holder at Tacloban on November 22, 1945 is the only Leyte record; as in the case of *Megalurus palustris,* this undoubtedly reflects undercollecting of the grassland habitat on Leyte.

Cisticola exilis semirufa **Cabanis, 1872**

Collected by Bartsch and by Rabor 1964. Specimens of the two Philippine species of *Cisticola* have not uncommonly been misidentified in museum collections, so I made it a point to verify identifications of all Leyte specimens. Both Holder's *C. juncidis* and Bartsch's one *C. exilis* were collected at Tacloban; the two species are known to be syntopic as well as sympatric elsewhere in the Philippines. (For a discussion, see Parkes, 1971c:29–30.) Rabor took one specimen at Santa Cruz on July 9 for the FMNH and specimens at Tambis on May 3, 7, and 11 and at Maalngon on May 26, 1964 for the USNM.

Locustella fasciolata **(J. E. Gray, 1860)**

Rabor collected the first Leyte specimen of this migrant for the USNM at Buri, Mount Lobi, May 29, 1964.

Phylloscopus olivaceus **(Moseley, 1891)**

Collected by Whitehead and by Rabor 1964. The latter took 23 in the Mount Lobi area in May (15 USNM, 8 FMNH) and three at Mount Kabalanti-an from July 1–6 (USNM). For a discussion of this species and its relatives, see Parkes, 1971c:30–34.

Phylloscopus borealis borealis **(Blasius, 1858)**

Although the Arctic Willow-Warbler is an abundant wintering bird in the Philippines, with five subspecies represented, few specimens have been taken on Leyte. I have not examined Everett's single specimen, an October bird. Other specimens have been identified using the criteria presented by Vaurie (1954), as well as comparisons with identified specimens in the USNM. Three Leyte specimens in the USNM appear referable to the nominate race. These were collected by Rabor at Tambis on May 3, 15, and 16, 1964.

Phylloscopus borealis hylebata **Swinhoe, 1860**

This small, rather yellowish race, with the first primary (of Vaurie's usage; = 10th or outermost primary) extending beyond the primary coverts, is represented by a male collected by Holder at Tacloban, September 28, 1945, and a female (USNM) taken by Rabor at Tambis, May 3, 1964.

Phylloscopus borealis transbaicalicus Portenko, 1938

One male taken by Rabor at Tambis on May 16, 1964 stands out from the rest of the series by its gray color and whitish eyestreak. These are characters of *transbaicalicus,* and the wing length of 63 mm. also matches measurements given by Vaurie (1954) for this race.

Orthotomus atrogularis frontalis Sharpe, 1877

Collected by Steere, Whitehead, Rabor 1937, Alcasid and Celestino, Caliwag, and Rabor 1964. This race was described from Zamboanga, Mindanao; I find no differences among specimens from Mindanao, Samar, and Leyte. Unpublished records include six specimens taken by Alcasid and Celestino at Patok from July 24–August 12, 19 taken by Rabor at Tambis (10 FMNH, 9 USNM) from May 2–June 16, 1964, and four more Rabor specimens, taken from Mount Kabalanti-an between June 14–21 (USNM).

Orthotomus nigriceps samarensis Steere, 1890

McGregor (1909) attributes this species to Leyte as having been collected by Whitehead, but neither Ogilvie-Grant (1897) nor Whitehead (1899) specifically mentions Leyte specimens. I believe special mention would have been made had Whitehead in fact taken it on Leyte, as *samarensis* had previously been known only from Steere's type specimen from Samar. It may be assumed, therefore, that McGregor was in error and that Whitehead's entire series was from Samar. Consequently, the first specimens from Leyte are five collected by Alcasid and Celestino at Patok. Rabor, collecting in both the Mount Lobi and Mount Kabalanti-an areas, took eight specimens for the USNM and five for the FMNH.

Rand and Rabor (1960:352) stated that their five Bohol specimens were indistinguishable from their six Samar specimens (two of which were "immatures"). In comparing four from Bohol, seven from Samar, and four from Leyte, using adult males only, I find that Bohol specimens differ from Samar and Leyte birds collectively in averaging slightly darker, less yellowish green above, with broader olive flanks restricting the yellow median area of the underparts. However, the differences are slight, and one Samar specimen matches the Bohol birds, so no formal separation appears to be warranted.

FAMILY **MUSCICAPIDAE** OLD WORLD FLYCATCHERS

Rhipidura superciliaris samarensis (Steere, 1890)

Collected by Steere, Whitehead, Rabor 1937, Alcasid and Celestino, Caliwag, and Rabor 1964. The two specimens collected by Alcasid and Celestino (♀ Balinsasayao, July 7, 1961; ♂ [Patok], August 11, 1961) are rather obviously grayer, both above and below, than a series of 14 Samar birds in the AMNH. The five collected by Rabor for the FMNH in the Mount Lobi and Mount Kabalanti-an regions were compared with long series of Bohol and Samar birds at the FMNH, but any possible geographic variation was obscured by the variation in skin preparation, mostly mediocre. The USNM has an additional eight Rabor Leyte skins, but insufficient comparative material from other islands.

Neither Delacour and Mayr (1946) nor duPont (1971) mentions sexual dimorphism in this species. McGregor (1909) mentions only a difference in the shade of blue of the dorsum in the nominate race (and by implication also in *samarensis*). The USNM series of seven ♂ and six ♀ of *samarensis* shows that males have a distinct wash of blue on the abdomen, whereas this area is much whiter (even pure white in some specimens) in females. This sexual difference in abdomen color appears to be a subspecific character of *samarensis*, as it does not hold true in the USNM series of six ♂ and five ♀ of *R. s. superciliaris*.

Rhipidura javanica nigritorquis **Vigors, 1831**

Collected only by Holder, who took an adult female at Tacloban on October 25, 1945.

For a discussion of minor trends toward geographically correlated variation in this species in the Philippines, see Parkes, 1965a:60.

Rhinomyias ruficauda samarensis **(Steere, 1890)**

Collected by Whitehead, Rabor 1937, Alcasid and Celestino, and Rabor 1964. Alcasid and Celestino took two males at Patok on July 26 and August 5, 1961. Rabor collected a total of 30 at his various 1964 localities, of which 19 are in the USNM, 10 in the FMNH, and one in the DMNH.

As conjectured by Rand and Rabor (1960:433), who saw no Leyte specimens, birds from that island do not differ from those of Samar and eastern Mindanao. Variation on Mindanao needs reexamination, however. Rand and Rabor (1957) described *R. r. zamboanga,* an excellent race, and stated that *mindanensis* Mearns, 1909 was a synonym of *samarensis.* In their later paper (1960:432–433) they expanded on this statement and listed their material. They had only five specimens from all of Mindanao other than the Zamboanga Peninsula and placed these in *samarensis.* According to Rand and Rabor, " . . . one of the two most western specimens, the type of *mindanensis* from Pantar, falls in the middle of the range of variation of the Samar series and these birds are best included with it [*samarensis*]." As the other "most western" specimen was also from Pantar, it is apparent that the Pantar population must be variable, because only one of the two specimens from there was cited as inseparable from Samar birds. Pantar is just north of the northern end of Lake Lanao, less than 50 miles from the base of the Zamboanga Peninsula. I would not question the separability of Pantar and Zamboanga birds were it not for the fact that I am unable to separate two recent specimens (AMNH) from Mount Matutum, Cotabato Province, in south-central Mindanao, from five recent specimens of *zamboanga*. When sufficient Mindanao material has been assembled to permit evaluation of individual variation, it may well indicate that *samarensis* is confined to the eastern part of the island, from the Gulf of Davao northward, and that the name *mindanensis* Mearns should be revived for the remaining Mindanao population of this species, with *zamboanga* as a synonym.

Ficedula basilanica samarensis **(Bourns and Worcester, 1894)**

Collected by Whitehead and by Rabor 1964. A specimen taken by the latter at Mount Kabalanti-an on July 3 is in the DMNH, and specimens from the Mount Lobi region (May 17–June 6) are in the FMNH (two) and the USNM (three).

Cyornis rufigaster philippinensis **Sharpe, 1877**

Collected only by Everett.

Muscicapa griseisticta **(Swinhoe, 1861)**

Three specimens collected in 1964 by Rabor (USNM) at Tambis on May 2 (two) and 7 represent the first Leyte record of this well-known migrant.

Culicicapa helianthea panayensis **(Sharpe, 1877)**

Collected by Whitehead and by Rabor 1964. The latter collected four specimens for the USNM: ♂ Tambis, May 2; ♂ ♀ Pana-on Peak, June 4; ♀ Bulog, July 1.

Hypothymis azurea azurea **(Boddaert, 1783)**

Collected by Steere, Whitehead, Rabor 1937, Holder, Alcasid and Celestino, Caliwag, and Rabor 1964. Holder took an unsexed bird (♀ by plumage) in "jungle" at Tigbao on November 11, 1945. Alcasid and Celestino collected nine specimens at Patok and Balinsasayao, including a juvenile at the latter locality on July 15, 1961. Rabor took only one female (originally misidentified as *Rhipidura superciliaris*) at Mount Kabalanti-an on June 26, 1964 for the FMNH and one "♂" [= ♀] at Tambis, May 5, for the USNM.

Pachycephala philippinensis apoensis **(Mearns, 1905)**

Collected by Whitehead, Rabor 1937, Alcasid and Celestino, Caliwag, and Rabor 1964. The series of 13 specimens collected by Alcasid and Celestino (Patok 12; Balinsasayao, 1) was part of my comparative material when I described *P. p. boholensis* (Parkes, 1966). Meyer de Schauensee and duPont (1962:167) compared Caliwag's four Mount Lobi, Leyte, specimens with eight from Misamis Oriental Province, northern Mindanao. They found no color differences, but their Leyte specimens were shorter in both wing and tail. I compared 13 Leyte and 14 Samar birds with 12 from Mount Apo, Mindanao, and vicinity (topotypes of *apoensis*). My measurements confirm a slight average size difference, but with much more overlap than shown by the figures given by Meyer de Schauensee and duPont. On the other hand, the Leyte/Samar series was very variable in color, some being as pale in general coloration as the Bohol birds. As indicated in the original description, however, *boholensis* is consistently separable from all populations being called *apoensis* by the gray rather than green edges of the primaries. Only in body color do some Leyte/Samar birds bridge the gap between *apoensis* and *boholensis*.

After having made the above comparisons, I saw but did not study the series of 13 Leyte specimens in the FMNH and nine in the USNM collected by Rabor in the Mount Lobi and Mount Kabalanti-an regions between May 13 and July 31, 1964.

FAMILY **MOTACILLIDAE** WAGTAILS, PIPITS

Motacilla cinerea robusta **(Brehm, 1857)**

The Gray Wagtail, a winter visitor, has been collected on Leyte only by Everett. Although duPont (1971:355) says that the Yellow Wagtail (*M. flava*) "winters throughout the Philippines," it has yet to be recorded from Leyte.

Anthus novaeseelandiae lugubris **(Walden, 1875)**

Collected by Steere and by Rabor 1964. The latter collector took a single male for the USNM at Santa Cruz on June 15. The bird was in very worn plumage, just beginning the prebasic molt of body feathers.

Anthus gustavi gustavi **Swinhoe, 1863**

Collected only by Steere.

FAMILY **ARTAMIDAE** WOODSWALLOWS

Artamus leucorhynchus leucorhynchus **(Linné, 1771)**

Collected by Everett, Bartsch, Rabor 1937, Holder, and Rabor 1964. Holder obtained two at Tacloban on October 27, two at Tacloban on October 30, and one at 1 mile west of Palo on November 18, 1945. One of the October 27 and one of the October 30 specimens are now at LSU; the other October 27 specimen is at the Moore Laboratory of Zoology, Occidental College. Rabor collected three adults for the USNM: Ma-alngon, May 29; Santa Cruz, June 14; Malinao, July 8.

FAMILY **LANIIDAE** SHRIKES

Lanius cristatus lucionensis **Linné, 1766**

Collected by Everett, Steere (record overlooked by McGregor [1909]), Bartsch, Holder, Bivins, and Rabor 1964. Holder collected three specimens, as follows: ♂ Tacloban, September 19; ♀ Tacloban airstrip, November 10; ♂ 1 mile west of Palo, November 16, 1945. Bivins collected a male at "Tanuan" (= Tanauan, just south of Palo on the east coast) on September 29, 1945. The label is annotated, "Death caused by round worms." Rabor collected an adult male for the USNM at Tambis on May 16, 1964. The specimen appears fresh and shows no molt.

Lanius schach nasutus **Scopoli, 1786**

Collected by Everett and by Caliwag.

FAMILY **STURNIDAE** STARLINGS

Aplonis panayensis panayensis **(Scopoli, 1783)**

Collected by Everett, Alcasid and Celestino, Caliwag, and Rabor 1964. One was banded at the MAPS station at Mahaplag in 1964 (McClure and Leelavit, 1972:281). An individual of this species, banded on September 9, 1965 at Calatagan, Batangas Province, at the southwesternmost corner of Luzon, was recovered on December 31, 1965 at Sogod, southern Leyte, about 350 miles to the southeast (McClure, [1967]:142). Movements of this magnitude may help to explain the lack of geographic variation within the Philippines in this highly polytypic species (13 subspecies recognized by Amadon, 1962b). Alcasid and Celestino collected five specimens (ad. ♂, ad. ♀♀, im. ♂, im. ♀) at Balinsasayao between July 8 and 16, 1961. Rabor's entire 1964 series of 21 (15 USNM, 6 FMNH) was taken on July 8 at Malinao. The series contains eight ad. ♂♂, seven ♀♀, one ad. sex?, one imm. ♂, and four imm. ♀♀.

Sarcops calvus melanonotus **Ogilvie-Grant, 1906**

Collected by Everett, Steere, Bartsch, Rabor 1937, Holder, Bivins, Alcasid and Celestino, Caliwag, and Rabor 1964. Lint and Stott (1948:46) found a nest containing two young at the San Pablo airstrip on August 11, 1945. The young left the nest on October 5.

Unpublished specimen records include seven collected by Holder 1 mile west of Palo between October 28 and November 18, 1945 (one now at LSU); one collected by Bivins at Palo on November 1, 1945; four collected at Balinsasayao by Alcasid and Celestino from July 6–12, 1961; and 44 collected by Rabor at various of his 1964 collecting localities between May 2 and July 18 (30 USNM, 14 FMNH).

The most recent discussion of geographic variation in this species, with special reference to Leyte, will be found in Parkes, 1971c:41–42. In that paper I unfortunately perpetuated the *lapsus* of Amadon (1962b:117) in spelling the subspecific name "*melanotus.*"

FAMILY **NECTARINIIDAE** SUNBIRDS

Anthreptes malacensis griseigularis (Tweeddale, 1877)

Rabor is the only collector to have obtained this species on Leyte. He stated (Rabor, 1938) that the five specimens, now no longer extant, from his earlier expedition were inseparable from a series from Samar. The only Leyte specimens in existence are a pair collected by Rabor at Ma-alngon on May 31, 1964 (USNM). The type locality of this subspecies is Surigao (not "Suriago" as in duPont, 1971:373), northeastern Mindanao. I have compared Rabor's Leyte male with one from Samar and one from Bucas Island, off Surigao (USNM). Measurements of these three specimens are as follows:

Wing (flat): Leyte, 63.5 mm.; Samar, 65 mm.; Bucas, 67 mm.
Culmen from forehead: Leyte, 21 mm.; Samar, 20.5 mm.; Bucas, 20.5 mm.

The Leyte male is a first-year bird and has not yet attained the iridescent tail nor the dark wings of the definitive plumage. The Bucas male has a distinctly darker gray throat than the Samar and Leyte males collectively. This may be a seasonal difference in wear, as the Bucas bird was taken on October 4, whereas the Samar bird was collected on April 3 and the Leyte bird on May 31. Salomonsen (1953:251) compared eight specimens of *griseigularis* from unspecified localities in Mindanao with five from Samar and declared them alike. He also commented on the large size of the USNM Bucas specimen, which exceeded that of any of the Samar and Mindanao specimens he measured.

Nectarinia sperata trochilus (Salomonsen, 1953)

Collected by Everett (record overlooked by McGregor [1909]), Steere, Whitehead, Rabor 1937, Alcasid and Celestino, Caliwag, and Rabor 1964. One was banded at the MAPS station at Mahaplag in 1964 (McClure and Leelavit, 1972:281). Alcasid and Celestino collected nine specimens at Balinsasayao from July 5–13, 1961 (including three juveniles on July 13) and 10 at Patok from July 19–August 7 (including a juvenile on July 28). Rabor collected 50 at various localities in the Mount Lobi and Mount Kabalanti-an regions, of which 31 are in the USNM, 16 in the FMNH, and three in the DMNH.

A history of the tortured nomenclature of this species in the Philippines, including my reasons for recognizing *trochilus* rather than synonymizing it with *sperata* as was done by duPont (1971:373) following Rand (1967), can be found in Parkes, 1971c:46–49.

Nectarinia jugularis jugularis (Linné, 1766)

Collected by Everett, Steere, Whitehead, Holder, and Rabor 1964. Holder obtained a single male at Tacloban on September 28, 1945. Rabor collected three males and two females at Tambis for the USNM, May 2–26.

As I have stated previously (Parkes, 1965a:62), I follow Rand (1951b) in being unable to justify the use of more than one subspecific name for the highly variable populations of this species from southern Luzon to Basilan. The description of *N. j. jugularis* given by duPont (1971:375) mentions the variability in the presence or absence of a brown border to the throat patch in males, but he gives only one color ("dark yellow") for the breast and abdomen. The name *dinagatensis* Mearns, 1905 was given to a variant in which the upper part of the breast is orange. The range of "*dinagatensis*" was extended to include Bucas (off northeastern Mindanao), Leyte, Bohol, and Panay by its author in the same paper in which he proposed a Mindanao race, *mindanensis* (Mearns, 1909a; erroneously cited as 1908 by Rand [1967:245] and duPont [1971:375]). There is no denying that the orange-breasted extreme occurs most frequently in the central islands, but individual variation precludes any consistently valid characterization of populations. Holder's Leyte specimen in CM closely matches a series of four adult males I collected in September 1956 at Antipolo, Rizal Province, central Luzon. None of Rabor's three males from Leyte is of the orange-breasted "*dinagatensis*" type. I do not know what Leyte material Mearns may have seen to justify his adding that island to the range of *dinagatensis,* as there were no Leyte specimens in the USNM in Mearns's time; he presumably borrowed Everett, Steere, or Whitehead specimens. For further information, the reader is referred to Rand's detailed analysis (1951b) of variation in this species.

Aethopyga pulcherrima pulcherrima Sharpe, 1876

Collected by Steere, Whitehead, Rabor 1937, Alcasid and Celestino, Caliwag, and Rabor 1964. Alcasid and Celestino collected eight specimens at Patok from August 4–10, 1961, including a juvenile on August 5. Rabor took 33 in the Mount Lobi area (22 USNM, 11 FMNH) and 11 in the Mount Kabalanti-an area (8 USNM, 3 FMNH) between May 4 and July 2, 1964.

The description of this form by duPont (1971:382) states that the forehead of males is "metallic purplish green." I find no green element at all in the specimens I have examined, and I would call this area an unqualified purple.

Aethopyga shelleyi bella Tweeddale, 1877

Collected by Rabor 1937, Alcasid and Celestino, and Rabor 1964. The five extant Leyte specimens are unfortunately unsuitable for comparison with non-Leyte material. Alcasid and Celestino took an adult male in very heavy molt on August 11, 1961; it lacks locality data on the label but was presumably collected at Patok. Adult females in worn and *very* worn plumage, respectively, were taken at Patok on July 24 and August 5. Rabor's two specimens from the Mount Kabalanti-an area (USNM) were taken on June 14 and July 1. Both are immature males, apparently correctly identified and sexed, but rather different from each other. The July 1 specimen is decidedly grayer, less yellow on the underparts. Rand and Rabor (1960:410) compared one adult male from the Zamboanga Peninsula, Mindanao, with four from Samar (the opposite extremities of the range attributed to *bella*, which was described from Surigao); they found minor differences, too slight to warrant nomenclatorial separation.

It should be pointed out that Delacour and Mayr (1946:232) erred in characterizing *bella* as "smaller than *flavipectus*; fewer vermilion streaks on breast." The race *flavipectus* lacks vermilion streaks on the breast. The comparison is valid if *bonita* (the subspecies adjoining *bella* to the west) is substituted for *flavipectus*.

[*Aethopyga siparaja magnifica* Sharpe, 1876]

No specimen of this species has ever been collected on Leyte. This appears to throw some doubt on the statement by Lint and Stott (1948:46) that "for a period of three months (October–December, 1945) we observed this beautiful sunbird in most of the second-growth areas surrounding Tacloban, Leyte." It is difficult to imagine what species might have been mistaken for *A. siparaja*, but until it has been collected, it is best considered as hypothetical for Leyte. Both Holder and Bivins were collecting around Tacloban during the same period. Although their collections were small, one might have expected an attempt to obtain so striking a bird as this if it were in fact present as persistently as suggested by Lint and Stott.

Note that there is an error in the caption of plate 80 in duPont, 1971. Figures F and G, not C and D as captioned, represent *Aethopyga siparaja*.

Arachnothera longirostra flammifera Tweeddale, 1878

Collected by Everett, Steere, Alcasid and Celestino, Caliwag, and Rabor 1964. Whitehead (1899:230) reported the species from Leyte but apparently did not collect it there. One was banded at the MAPS station

Alcasid and Celestino collected one specimen at Balinsasayao on
at Mahaplag in 1964 (McClure and Leelavit, 1972:281).
July 10, 1961 and three at Patok on August 1 and 8 (plus one undated).

The August 1 and undated specimens are juveniles. Rabor collected 23 in the Mount Lobi and Mount Kabalanti-an areas (15 USNM, 8 FMNH), of which two are juveniles (Tambis, May 16, FMNH; Ma-alngon, May 26, USNM).

Some males from Mindanao differ from those of Leyte (type locality), Samar, and Bohol in attaining a degree of orange wash on dorsum and wing edgings not seen in those from the other islands. This is inconsistent, however, and females are inseparable; so I do not believe the Mindanao population should be formally separated from *flammifera.*

Arachnothera clarae philippinensis **(Steere, 1890)**

Collected by Whitehead, Rabor 1937, and Rabor 1964. Rand (1967:286) gave the range of *philippinensis* as "Samar and presumably Leyte. . . ." I have seen one of Whitehead's specimens (AMNH) and the seven collected by Rabor at Ma-alngon (4 USNM, 2 FMNH) and Paniniklan (1 USNM). These, as predicted by Rand, match Samar specimens.

FAMILY **DICAEIDAE** FLOWERPECKERS

Prionochilus olivaceus samarensis **Steere, 1890**

Collected by Steere (overlooked by McGregor [1909]), Whitehead, Rabor 1937 and Rabor 1964. Rabor took six specimens, all but one in the Mount Lobi region, the sixth at Bulog. Four of these are now in the USNM, and one each in the FMNH and the DMNH.

Dicaeum bicolor bicolor **(Bourns and Worcester, 1894)**

Collected by Whitehead, Rabor 1937, Caliwag, and Rabor 1964. Rabor's FMNH series of eight was taken on Mount Kabalanti-an, June 26–July 4. The USNM material includes 11 from the same area, June 22–26, including several juveniles, plus seven taken in the Mount Lobi area, May 12–June 1.

As I have shown (Parkes, 1971c:50–52), previous treatments of this species in the literature were garbled. The Samar/Leyte/Bohol population belongs with *bicolor* of Mindanao, not with *inexpectatum* (Hartert, 1895) of Mindoro and Luzon. As indicated in my paper, Samar/Leyte/Bohol birds are slightly differentiated from those of Mindanao, both in size and color, but insufficiently so for formal nomenclatorial separation.

Dicaeum australe australe **(Hermann, 1783)**

Collected by Whitehead, Alcasid and Celestino, Caliwag, and Rabor 1964. Alcasid and Celestino collected nine specimens at Balinsasayao and two at Patok. Rabor took a total of 55 at his various 1964 localities (39 USNM, 15 FMNH, 1 DMNH). The Mount Lobi area material in the

USNM includes juveniles taken on May 7 (two), 17, 19, and 22 and on June 1.

In a family tending toward pronounced geographic variation, *D. a. australe* is surprisingly uniform over a very large range in the Philippines. The only variation I have found is a *slight* tendency for the blue-black dorsal color of males to be deeper in Luzon specimens.

Dicaeum trigonostigma cinereigulare Tweeddale, 1877

Collected by Steere, Whitehead, Rabor 1937, Alcasid and Celestino, Caliwag, and Rabor 1964. Alcasid and Celestino collected seven specimens at Balinsasayao from July 5–15 and three at Patok from August 6–7, 1961. Rabor took no less than 89 at his various collecting localities (49 USNM, 40 FMNH) between May 3 and July 4, 1964.

There are some geographically correlated trends among populations currently united in *cinereigulare*. The AMNH specimens from Leyte match near topotypes from northern Mindanao in having less yellow, more gray on the throat than most specimens of a long (32) series from Samar, in both sexes. The Samar birds also tend to have a slight wash of greenish on the rumps of males and of yellow on those of females, reduced or lacking in Leyte birds. On the other hand, two specimens from Davao, southern Mindanao, match the *Samar* series, which makes no geographic sense. The question of subdivision of *cinereigulare* must remain open until larger samples from more areas of Mindanao can be compared with the excellent Samar and Leyte material.

Dicaeum hypoleucum pontifex Mayr, 1946

Collected by Whitehead, Rabor 1937, Alcasid and Celestino, Caliwag, and Rabor 1964. Only two specimens were collected by Alcasid and Celestino, a juvenile female at Balinsasayao on July 6 and an adult female at Patok on August 2, 1961. Rabor collected 33 in the Mount Lobi area (21 USNM, 12 FMNH) and nine in the Mount Kabalanti-an area (7 USNM, 2 FMNH).

Dicaeum pygmaeum pygmaeum (Kittlitz, 1833)

Collected by Everett, Whitehead, Caliwag, and Rabor 1964. The Caliwag specimen was erroneously identified as *Dicaeum ignipectus* by Meyer de Schauensee and duPont (1962:169). The only unpublished Leyte specimens are a pair collected by Rabor for the USNM at Tambis on May 11.

[*Dicaeum ignipectus* (?*bonga* Hartert, 1904)]

I have examined the specimen in the DMNH that, as just mentioned, was reported under this name as the first record of the species for Leyte. It is a specimen of *D. p. pygmaeum*; *D. ignipectus* has yet to be recorded from Leyte.

FAMILY **ZOSTEROPIDAE** WHITE-EYES

Zosterops everetti boholensis **McGregor, 1908**

Collected by Steere, Whitehead, Rabor 1937, Alcasid and Celestino, Caliwag, and Rabor 1964. Alcasid and Celestino collected five males at Patok between July 27 and August 12, 1961. Rabor obtained a fine series of 49 (27 USNM, 22 FMNH) in the Mount Lobi and Mount Kabalantian regions in 1964.

The Leyte population appears in most of the literature under the name *basilanica* Steere, 1890; the Caliwag specimen was so listed by Meyer de Schauensee and duPont (1962:171), although they called attention to differences between it and their Mindanao series. For the evidence justifying the association of the Leyte population with *boholensis,* see Parkes, 1971c:56.

FAMILY **PLOCEIDAE** WEAVERBIRDS

Passer montanus saturatus **Stejneger, 1885**

A juvenile male collected by Rabor at Santa Cruz for the USNM on June 14, 1964 is the first record for Leyte. This specimen is an exact match for a juvenile of similar age from Japan in the USNM and is too richly colored for *malaccensis,* the subspecies introduced around Cebu City (Parkes, 1959). The species has therefore apparently spread to Leyte from Luzon, where *saturatus* is the introduced race.

FAMILY **ESTRILDIDAE** MANNIKINS, GRASSFINCHES

Lonchura leucogastra manueli **Parkes, 1958**

Collected by Whitehead, Rabor 1937, Alcasid and Celestino, and Rabor 1964. A single specimen was collected by Alcasid and Celestino at Patok, 36 were collected by Rabor in his two major areas, and four were banded at the MAPS station at Mahaplag in 1966 (McClure and Leelavit, 1972:281).

No specimens from Leyte had been seen at the time of the description of *manueli.* The AMNH specimen and the 10 in the FMNH match *manueli* in dark dorsal coloration, but they average somewhat paler brown (less blackish) on the breast, an approach to the race *everetti* (Tweeddale, 1877) to the north.

Lonchura malacca jagori **(Martens, 1866)**

Collected by Everett, Steere, Bartsch, Bivins, and Rabor 1964. In addition, one was banded at the MAPS station at Mahaplag in 1964 (McClure and Leelavit, 1972:281). Previously unpublished records are those of Bivins, who collected a male at Palo in December (exact date not given) 1945 and Rabor, who took six at Tambis from May 3–20, 1964 for the FMNH and 20 at various localities in the Mount Lobi and Mount Kabalanti-an areas for the USNM.

SUMMARY

The avifaunal relationships and the history of bird collecting on the Visayan island of Leyte, Philippines, are reviewed. Acceptable sight records or specimen records exist for 180 species and four additional subspecies on Leyte. Data are presented for all hitherto unpublished records from Leyte known to the author, and reference is made to previous records. Taxonomic notes are given for many species. The first records for Leyte are presented for the following (some of these have been mentioned in the author's taxonomic papers):

Gorsachius goisagi
Spizaetus philippensis
Charadrius dubius curonicus
Charadrius alexandrinus dealbatus
Sterna fuscata serrata (first Philippine record)
Columba vitiensis griseogularis
Streptopelia chinensis tigrina
Cuculus fugax pectoralis
Cuculus micropterus micropterus
Cuculus saturatus horsfieldi
Chrysococcyx xanthorhynchus amethystinus
Collocalia esculenta marginata
Cypsiurus batasiensis pallidior
Halcyon winchelli nigrorum
Pitta steerii coelestis
Hirundo rustica gutturalis
Hirundo rustica saturata
Megalurus timoriensis alopex
Cisticola juncidis tinnabulans
Locustella fasciolata
Phylloscopus borealis hylebata
Phylloscopus borealis transbaicalicus
Rhipidura javanica nigritorquis
Muscicapa griseisticta
Passer montanus saturatus

Two new subspecies are described: *Accipiter virgatus quagga* (from Mindanao) and *Rhabdornis inornatus leytensis.*

Two species, *Cuculus canorus* and *Aethopyga siparaja,* have been recorded from Leyte on insufficient evidence and are considered hypothetical for the island.

One species, *Dicaeum ignipectus,* was erroneously recorded from Leyte based on misidentification of a specimen of *D. pygmaeum.*

The Philippine status of one species is changed: Philippine records of *Egretta garzetta* are assigned to *E. g. garzetta* rather than to *E. g. nigripes* as heretofore in the Philippine literature; the latter does not occur in the Philippines.

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GEOGRAPHIC VARIATION IN THE SAVANNAH SPARROWS OF THE INLAND SOUTHWEST, MEXICO, AND GUATEMALA

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INTRODUCTION

Savannah Sparrows (*Ammodramus sandwichensis*) breed in inland southwestern North America southward locally to the highlands of Guatemala. Although the extensive review of Peters and Griscom (1938) treated geographic variation in several of these populations, there have been no studies that emphasize all of them and none that are recent. Several collections, particularly of fresh, autumn-plumaged birds, have been made in recent years, providing the basis for at least this preliminary review of the breeding birds of the region. The populations treated are mainly those extending from the highlands of extreme southwestern Guatemala northward through Arizona, New Mexico, and Colorado. Other populations dealt with are those ranging northward into the Great Basin, Rocky Mountains, and Great Plains (all presently assigned to *A. s. nevadensis*), with Nevada and adjacent California birds serving as especially useful comparison samples. Names applied most recently (Paynter, 1970) to these populations are: *wetmorei* (Guatemala), *brunnescens* (southern Mexico), *rufofuscus* (northern Mexico, Arizona, and New Mexico), and *nevadensis* (Colorado, etc.). Northern birds are probably largely migratory and southern ones resident, although no detailed studies have been made to verify their status.

MATERIALS AND METHODS

Specimens of probable breeding or resident birds examined are as follows (numbers in parentheses are molting or fresh-plumaged birds from late summer to December): California–67 (9), Nevada–40 (1), Colorado–25 (21), Arizona–21 (4), New Mexico–10, Chihuahua–7, Durango–27 (7), Nayarit–4, Jalisco–2 (2), Michoacán–4 (4), Guanajuato–2 (1), State of Mexico–28 (12), Distrito Federal–17 (3), Hidalgo

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—5 (1), Veracruz—5, Tlaxcala—2, Puebla—15 (3), Guatemala—5. These total 286 specimens, to which may be added 21 juveniles: California—11, Nevada—5, Arizona—1, State of Mexico—1, Hidalgo—1, Puebla—2. I also examined two score of specimens from Idaho, Oregon, Washington, Wyoming, British Columbia, and Alberta, mainly of breeding-plumaged adults.

My major emphasis is the detailing of variation in color and pattern, as measurements revealed no significant geographic differences over the area. For color and pattern comparisons, geographical samples of specimens were sorted by dates and degree of wear and then examined in series in both natural and artificial light. The most important comparisons are those involving autumn plumage, even though the series of 68 specimens is relatively small. Specimens in active molt and those taken early in the season can be considered with certainty to be from the breeding grounds, but the origin of molt-completed or later-season birds is sometimes open to question. In general, I have assumed a local origin if specimens conform to observed or expected patterns of geographic variation for a population. Obviously, some margin for error exists in this approach, and I have pointed this out whenever possible. Late spring and summer birds which are not badly worn are also of value in color and pattern comparisons. Late summer and late winter to early spring birds are often too worn for comparisons, although some of these birds provide information on populational plumage characteristics.

Another factor besides wear affecting the assessment of coloration in specimens is how long ago they were collected. In general, the browns become redder with age (or "fox") in these sparrows, as is true in many other species. In most cases I have been able to detect the change simply by comparing older with more recently collected specimens from a locality. Only in the Guatemala series was this impossible, as only the type series (collected in 1897) is available. As a rule, foxing is not so drastic in better-cared-for material, but in some old birds the shift in color is marked. I might also add that birds in molt, especially the postnuptial molt, tend to be somewhat darker and browner while the feathers are growing than just after.

Mensural characters used were wing chord, length of culmen (from nostril), height of bill at the base, and lean body weight.

PLUMAGE COMPARISONS

Juvenal Plumage

My series of juveniles is not extensive enough to make more than superficial assessment of the geographic variation, and only in the Great Basin is even a partial review possible. From that locality I assembled the following specimens for study: California: Mono Co., Convict Creek, Long Valley, 6900′–2♂♂, 16–17 July 1922; Sierra Co., Campbell Hot Springs–♂, 18 July 1919; Inyo Co., Farrington Ranch, Laws–sex?, 6 July 1917; Lassen Co., 1 mile south of Red Rock P.O.–3♂♂, 2 sex?, 11–22 July 1928. Nevada: Fish Lake, Fish Springs Valley–sex?, 16 July 1933; Elko Co., west side of Ruby Lake and Ruby Mts. (Secret Pass, 6200′) –2♂♂, 2 sex?, ♀, 10 July–2 August 1927.

Additional material from farther south consists of the following: Arizona: Apache Co., Crescent Lake, 21 miles south of Springerville, 9100′–sex?, 11 August 1935. State of Mexico: 1 mile southwest of Almoloya del Río, south of Lerma–sex?, 10 September 1961. Hidalgo: Lago de Tecocomulco–♀, 2 November 1956. Puebla: Laguna del Carmen–2♂♂, 2 September 1961.

The Great Basin series of juveniles is quite variable, even among specimens at similar developmental stages and from single localities. The ground color of the upperparts varies from grayish white to pale orange-buff, with some birds having a mixture of these. Most specimens with buff above also have at least some whitish edgings on the back, and all have the superciliary whitish. The dorsal streaking varies from light to medium brown, with the extent and width variable but usually moderate. The underparts are generally whitish, and all but three specimens have at least a tinge of buff on the breast. The breast streaking varies from light gray to brown, with the extent light to moderate and the width narrow (and spotlike) to moderate. The wing edgings (tertials and inner secondaries) are mainly light rufous, except for the innermost, which are usually whitish. These edgings are also present in the autumn plumage.

From the preceding description, the Great Basin series of juveniles obviously is not subject to succinct characterization. This is contrary to the contention of Grinnell (1910:312–314), who implied that the population was homogeneous in this plumage and actually used a juvenile as the type of *A. s. nevadensis* (type locality: Soldier Meadows, Humboldt Co., Nevada).

Farther southward, the lone Arizona specimen is essentially identical to the darker and more heavily streaked Great Basin specimens and thus cannot be distinguished from them. The single specimen from the State of Mexico is somewhat younger than other specimens examined, although not to the point of precluding comparison. It is similar to the buffier Great Basin birds, but it is somewhat darker and richer than any of those. Three Hidalgo and Puebla specimens differ from the State of Mexico specimen; they are similar *inter se* and in turn to Great Basin specimens. They differ from the latter in being slightly less heavily streaked on the crown, and the wing edgings are also somewhat more extensive and darker rufous—as is the State of Mexico specimen. In essence, then, the Arizona, Hidalgo, and Puebla juveniles are similar to certain Great Basin birds, whereas the State of Mexico specimen is darker and richer in color. In view of the variability of the Great Basin series and the paucity of more southern specimens, no statement on the variation in juvenal plumage seems justified at present.

Adult Plumage

The Savannah Sparrow has two plumages each year: the *autumn* (or *basic*) *plumage,* which is obtained in the late summer and early autumn through a complete postnuptial (prebasic) molt (adults) or a partial postjuvenal (prebasic) molt (immatures), and the *breeding* (or *alternate*) *plumage,* which is obtained in late spring and early summer by a partial prenuptial (prealternate) molt. I have not made a detailed study of the molts in this species; in particular, a question exists as to how variable the extent of feather replacement is in the prenuptial molt, both in and between populations. In the specimens I examined, all birds appear to have at least some feather replacement prior to breeding, and in some this is quite extensive.

I have segregated the specimens from inland, southwestern North America into the seven samples (see Map): *Guatemala, Puebla* and vicinity (including Tlaxcala, Veracruz, and adjacent Hidalgo), *Valley of Mexico* (Distrito Federal and adjacent, easternmost State of Mexico), *Lerma* area (remainder of the State of Mexico and adjacent Guanajuato, Michoacán, and Jalisco), *Northern Plateau* (Durango, Chihuahua), *Southwest* (Colorado, Arizona, and New Mexico), and, for comparative purposes only, the *Great Basin* (Nevada and adjacent easternmost California). These lines of demarcation are based on natural geographic boundaries and on similarities in the aggregations of specimens themselves. These samples will be described in sequence from south to north, with each being compared to Great Basin birds and to populations to the south of it to avoid repetition. Thus, to see how a southern sample differs from a more northern one, consult the latter one.

GUATEMALA

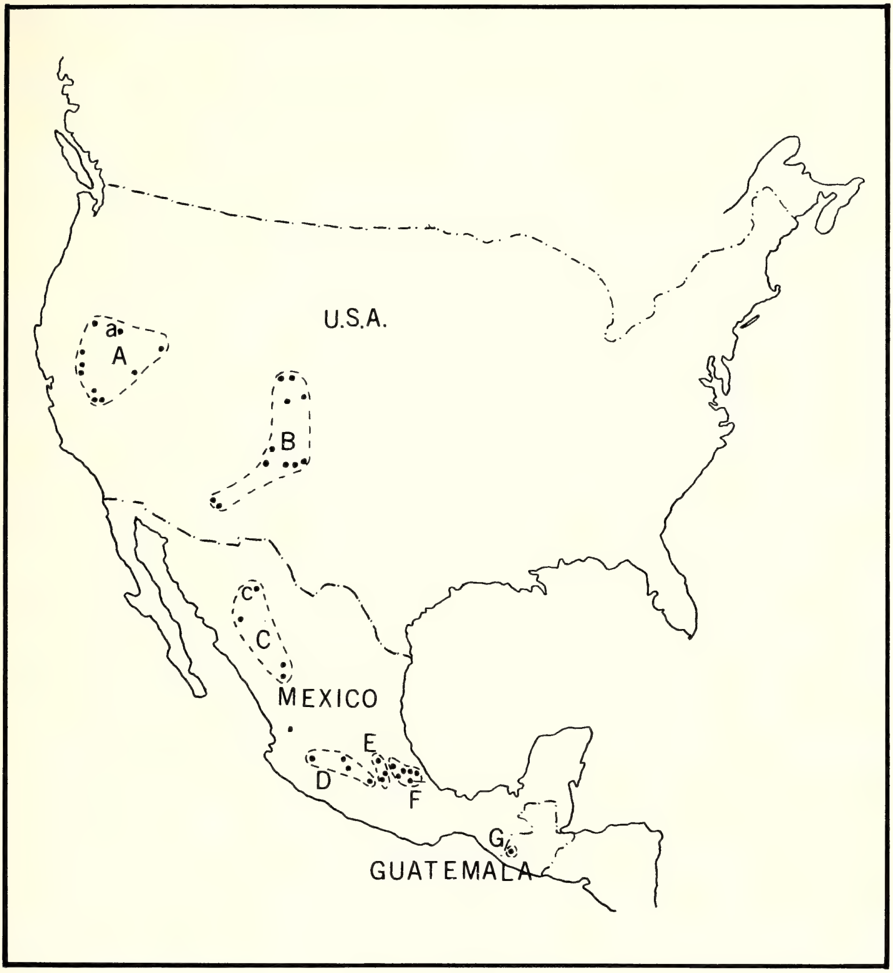
Specimens

AUTUMN-WINTER: None available.

SPRING-SUMMER: Dept. of Huehuetenango: Hacienda Chancol, 10,000′; 2♂♂, 3♀♀ (all somewhat worn), 11–17 June 1897.

Description

BREEDING PLUMAGE: Upperparts light reddish to almost ruddy brown, with dorsal streaking dark reddish brown, moderate in width and extent;



Samples of Savannah Sparrows. **A**, Great Basin (**a** = type locality of *A. s. nevadensis*); **B**, Southwest; **C**, Durango (**c** = type locality of *A. s. rufofuscus*); **D**, Lerma; **E**, Valley of Mexico (type locality of *A. s. brunnescens*); **F**, Puebla; **G**, Guatemala (type locality of *A. s. wetmorei*).

edgings of back feathers pale brown to whitish; crown stripe pale buff to yellowish white; superciliary yellowish white posteriorly and medium yellow anteriorly; wing edgings medium rufous; ventral streaking medium to dark gray, moderate in extent and width.

Comparisons

Breeding plumage: Compared to Great Basin specimens, those from Guatemala are darker and more reddish (much less grayish) brown above, with the dorsal streaking darker, redder brown, and more extensive. The yellow of the superciliary is also darker and more extensive than in Great Basin birds, the rufous wing edgings are darker, and the light streaking of the back is buffier (less whitish to grayish). I would emphasize that in spite of the age of the Guatemalan specimens, they do not appear unduly foxed; thus, comparisons with them are probably valid. (Other comparisons are discussed under the populations that follow.)

Comments

These specimens, taken by W. B. Richardson and now in the British Museum (Natural History), remain unique in that there seem to be no subsequent records of Savannah Sparrows summering in the Guatemalan highlands. There is no question about their validity, as during the same period Richardson took a series of the endemic *Dendroica coronata goldmani* in the same area.

PUEBLA

Specimens

Autumn-winter: *Puebla*: Laguna del Carmen—♀ and ♂, 23 September 1964 and 12 November 1958.

Spring-summer: *Puebla*: Laguna del Carmen—4♂♂, 16 May 1962; 2 miles east of El Carmen—♀, 11 August 1956; 1.5 miles northwest of Zaragosa—♂, 25 April 1958; 50 miles east of Puebla—♂, 30 July 1943; 1 mile east of Ocojala, M. de Chignahuapán—♂, ♀, 16 August 1958; Chalchicomula—2♂♂, ♀, 9–14 April 1893; Atlixco—3♂♂, 2♀♀, 23 July–27 August 1893 and 17 June 1903. *Tlaxcala*: Apixco—♂, 9 April 1893; 5 miles west of Tlaxcala—♂, 18 April 1958. *Veracruz*: Perote—4♂♂, 26 May 1939; 9 kilometers north of Perote—♀, 12 July 1970. *Hidalgo*: Irolo—♀, 3 March 1893; Tulancingo—3♂♂, 3♀♀, 18–24 August 1893; Lago Tecocomulco—♀, 22 May 1958.

Description

Autumn plumage: Upperparts light grayish brown, with dorsal streaking medium dark brown, moderate in width and extent; back feathers edged with pale grayish buff; crown stripe and superciliary pale grayish buff, pale yellowish over eye and anteriorly; wing edgings grayish rufous to light reddish brown; ventral streaking medium brown, rather narrow and moderate in extent; buff of breast and sides pale and limited.

Breeding plumage: Upperparts more grayish brown, with streaking and light edgings more prominent; yellow of superciliary more conspicuous; central streaking grayer and less conspicuous, buff mainly absent.

Comparisons

Autumn plumage: Compared to Great Basin specimens, the two in this series are somewhat browner (less grayish) on the upperparts, with browner streaking and buffier (less grayish to whitish) edgings on the dorsum. Moreover, they have deeper rufous wing edgings and ventrally they are generally more heavily streaked. One Great Basin specimen (Calif.: Modoc Co., ♂, 4 August 1910) is very similar to the two Pueblan specimens, but it is somewhat less heavily streaked above. (There are no autumn-plumaged Guatemalan specimens available for comparison.)

Breeding plumage: Compared to Guatemalan specimens, the Pueblan birds are definitely paler and grayer (less reddish) above, with paler, narrower, and less extensive dorsal streaking. The ventral streaking in Guatemalan birds is also somewhat darker and heavier, the wing edgings deeper rufous, and the patterns of the head more contrasting. Compared to Great Basin specimens, those of the Puebla series are somewhat browner above (less grayish), with narrower, browner streaking and less whitish edgings on the dorsum (ventral streaking is similar).

VALLEY OF MEXICO

Specimens

Autumn-winter: *Distrito Federal*: southwest corner of Lago Texcoco, near Airport—3♂♂, 25 October 1962; Tlalpam—♀, 8 December 1892. *Mexico*: north shore of Lago Texcoco—2♂♂, ♀, 4 October 1959. *Hidalgo*: Tula—sex?, 14 December 1958.

Spring-summer: *Distrito Federal*: southwest corner of Lago Texcoco, near Airport—3♀♀, ♂, 6 May 1962; Ixtacalco—4♂♂, ♀, 25 June 1904; Peñón—♀, 17 June 1933 and 2♀♀, ♂, 21 August 1933; no locality—♀, 15 April 1930. *Hidalgo*: Requeña Reservoir, near Tepejí del Río—♀, 2 July 1954; Tula—♀, 11 March 1893. *Mexico*: 7 miles east of Chalco—♂, 15 August 1965; San Pedro Techuchulco—♀, ♂, 5 June 1964.

Description

Autumn plumage: Upperparts light olive-brown, with broad and extensive dark brown streaking; back feathers edged light grayish brown to light buff; crown stripe and superciliary pale brown to pale grayish buff, generally with tinge of yellowish over eye and sometimes anteriorly; wing edgings grayish rufous to medium rufous, sometimes giving way to whitish; ventral streaking medium to dark brown, moderate in width and extent; buff of breast and sides pale to light and moderate in extent.

Breeding plumage: Upperpart similar, but dorsal streaking more grayish brown and narrower; yellow over eye more prominent and buff absent below.

Comparisons

Autumn plumage: Compared to Puebla birds, those from the Valley of Mexico have the upperparts slightly darker and redder brown (lacking grayish cast), with the dorsal streaking richer brown, broader, and more extensive. Furthermore, the ventral streaking is broader and more extensive; and, as a rule, the buff on the breast and sides is more pronounced. The Tula specimen is actually an intergrade toward Puebla specimens, with its somewhat grayish brown upperparts and narrow streaking on the back. Compared to Great Basin specimens, those from from the Valley of Mexico are distinctly browner (less grayish) and darker above, with darker brown, wider, and more extensive dorsal streaking; browner or buffier (less grayish or whitish) edgings on the back; and more and darker rufous wing edgings. Ventrally, Valley of Mexico birds are buffier, with broader and more extensive streaking.

Breeding plumage: Compared to Guatemalan specimens, those from the Valley of Mexico are somewhat paler and less reddish (more olive-brown) above and have the dorsal and ventral streaking slightly paler. Compared to Pueblan specimens, those from the Valley of Mexico are darker and less grayish brown above, with broader and more extensive streaking above and below. There is some overlap or approach in these characters, involving one Lago Texcoco and two Puebla (Ocojala and Zaragosa) specimens. Compared to Great Basin birds, those from the Valley of Mexico are distinctly darker and browner above, with darker rufous wing edgings, and browner and more extensive dorsal streaking; the ventral streaking also averages broader.

Comments

I have been able to examine three of the original specimens used by Butler (1888) in his description of the race *A. s. brunnescens* (type locality: Valley of Mexico). I agree with Peters and Griscom (1938:471) that the type series is heterogeneous and does not represent a pure sample of that breeding population. Butler's No. 30 (now Carnegie Museum No. 4156), a female taken on 8 December 1879, is apparently a migrant from the Great Basin; i.e., *A. s. nevadensis*. Butler's No. 3 (now in the R. L. Dickerman Collection), a male taken on 20 November 1879, also appears to be a northern migrant, probably *A. s. anthinus*. Although foxing has reddened its coloration to some degree, the specimen has the streaking too pallid to represent a Mexican bird. Butler's No. 29 (USNM 113,558), a male taken on 8 December 1879, was designated the lectotype of *A. s. brunnescens* by Peters and Griscom (1938:472). Although it undoubtedly represents a bird of the breeding population of that general area of Mexico, its characteristics would seem to make the exact origin of the specimen open to question.

Compared to five autumn-winter birds from the Valley of Mexico, the lectotype is redder brown above, with darker dorsal streaking and more conspicuous buff edgings on the back. On the other hand, a closer resemblance exists to Lerma and Northern Plateau specimens, of which eight and seven respective specimens were compared. Compared to the latter, the lectotype is somewhat paler above (especially on the nape), with the crown in particular less heavily streaked and the ventral streaking generally paler. The lectotype differs from most Lerma specimens in that it is more darkly streaked and has buffier edges above, giving it an intermediate appearance between Northern Plateau and Lerma birds. Perhaps the best agreement is with a Lerma bird (imm. ♀, near Almoloya del Río, Mexico, 25 November 1962), although the lectotype is somewhat more extensively marked with buff above and is more pallidly streaked below than that specimen. Based on these comparisons, it is my guess that the lectotype is from farther north in Mexico, perhaps as a stray (or possible migrant) to the Valley of Mexico. (The specimen cannot be considered typical of Valley of Mexico autumn-plumaged birds, although one cannot rule out its being a variant of that population.) Clearly the lectotype is too dark and reddish to represent the Puebla, Southwest, and Great Basin populations, and the possibility is extremely unlikely that it represents the Guatemalan population.

LERMA SAMPLE

Specimens

AUTUMN-WINTER: *Mexico*: Hacienda Atenco, etc., in vicinity of Almoloya del Río—2 ♀♀, ♂, 25 November 1962 and ♂, 26 November 1961; kilometers 100–108, State of Mexico-Morelia Highway—2 ♂♂, 16 November 1962 and ♀, ♂, 27 November 1958. *Michoacán*: 4.7 miles west of Álvaro Obregón—2 ♂♂, ♀, 1 December 1958. *Guanajuato*: Yuriría—♂, 21 November 1956. *Jalisco*: Lagos—♀, 27 November 1896.

SPRING-SUMMER: *Mexico*: Hacienda Atenco, near Almoloya del Río —11 ♀♀, ♂, 28 May 1961; Lerma—♀, 4 July 1904; 25 kilometers south of Toluca—♂, 10 August 1946; kilometers 100–104, Mexico-Morelia Hwy.—4 ♂♂, 1 unsexed, 6–8 June 1961 and 27 May 1954. *Guanajuato*:

Yuriría—♀, 8 May 1958. *Jalisco*: La Barca— 2 ♂♂, 29 June 1903; Charco Ojuelos—5 ♂♂, 23–24 August 1947.

Description

Autumn plumage: Upperparts medium light brown to reddish brown, with broad and extensive dark reddish brown streaking dorsally; edgings of back feathers light brownish to buff and whitish; crown stripe and superciliary light grayish buff to light buffy brown, with at least a tinge of yellowish over the eye and sometimes anteriorly; wing edgings light to medium rufous, sometimes giving way to light gray or whitish; ventral streaking medium to dark brown, moderate to relatively broad and moderate to heavy in extent; buff of breast and sides pale to light, limited to moderate in extent (wears off progressively into winter).

Breeding plumage: Upperparts tend to be grayer brown, with some specimens notably grayish brown; streaking above and below grayer (less brownish), generally narrower and less extensive; buff generally absent ventrally; yellow around eye more conspicuous.

Comparisons

Autumn plumage: Compared to Valley of Mexico birds, those from the Lerma region are generally more richly colored above, being more reddish (less olive) brown, with the dorsal streaking darker brown and tending to be more extensive, especially on the crown. One Valley of Mexico specimen (D. F., Lago Texcoco, ♂, 25 October 1962) is very similar to less reddish Lerma birds in respect to the upperparts, and the few least reddish specimens from the Lerma series also show an approach to Valley of Mexico birds. The two Puebla specimens are notably paler and grayer than Lerma specimens, with paler, narrower, and less extensive streaking above and below. Lerma specimens differ from those of the Great Basin in being distinctly darker and more reddish (less grayish) brown above, with the dorsal streaking darker and browner, broader, and more extensive; the edging to the back feathers browner or buffier (less whitish to grayish); and the wing edgings deeper rufous. Lerma specimens are also more darkly and broadly streaked below and have the buff more extensive and darker.

Breeding plumage: In comparing Lerma with Valley of Mexico birds, one finds considerable overlap and many specimens cannot be segregated. There is a tendency for Lerma birds to be more reddish (less olive) brown above, but some Lerma birds are so grayish above as to be difficult to distinguish on this basis even from Puebla birds. The latter tend to be less heavily streaked above and below, with the breast streaking often paler as well. Guatemalan birds are quite similar to Lerma birds, although the latter average slightly less ruddy and less heavily streaked on the upperparts (there is much overlap). Compared to Great Basin birds, those from the Lerma series are darker and browner (less grayish) above, with browner (less gray) streaking above, browner or buffier (less whitish) edgings on the back, deeper rufous wing edgings, and darker, broader ventral streaking.

Comments

The Lerma series is the most variable of those yet discussed, both in autumn-winter and spring-summer plumages. One might assume that part of the variability is due to heterogeneity in the geographic origins of specimens in the sample. This may be the case in autumn-winter specimens (taken over the period 16 November to 1 December), possibly as the result of the infusion of migrants. However, in the spring-summer sample, variability is still high, e.g., in the 12 specimens from Almoloya del Río, Mexico, taken on 28 May and almost certainly on the breeding grounds. The question can be resolved only by more collecting, especially in late summer and early autumn.

NORTHERN PLATEAU

Specimens

AUTUMN-WINTER: *Durango*: Laguna de Santiaguillo—4 ♂♂, 3 ♀♀, 15–18 November 1971. *Chihuahua*: Madera—♀, 7 October 1921.

SPRING-SUMMER: *Chihuahua*: Babicora—2 ♂♂, ♀, 15 June 1902; 17 miles east of La Junta—3 ♀♀, ♂, 31 May–7 June 1949. *Durango*: 12 miles northeast of Durango—♀, 25 May 1946; Laguna de Santiaguillo—17 ♂♂, 2 ♀♀, 19–24 April 1972. *Nayarit*: 2 ♂♂, 2 ♀♀, Laguna San Pedro Lagunillas, 24–25 May 1962.

Description

AUTUMN PLUMAGE: Upperparts medium light reddish brown; dorsal streaking dark brown, broad, and extensive, especially on the sides of the occiput; edgings on back grayish white to buff; crown stripe and superciliary pale brown to buff, pale yellow over the eye and anteriorly; wing edgings pale to medium rufous, sometimes giving way to pale grayish or buffy white; ventral streaking medium brown to blackish, relatively narrow to medium width, light to moderate in extent; buff of breast and sides generally pale and limited in extent.

BREEDING PLUMAGE: Upperparts as in autumn plumage but tending toward paler brown or grayish brown in some specimens; yellow over eye more extensive and brighter; ventral streaking grayer and paler, buff generally lacking below.

Comparisons

Autumn plumage: Compared to Lerma birds, Northern Plateau specimens are equally dark but the upperparts are slightly browner (less reddish), the dorsal streaking is somewhat darker and generally heavier on the crown, and the crown stripe and superciliary are paler and buffier. The effect is of more contrastingly marked dorsal plumage in Northern Plateau specimens, with a brighter aspect (less dull) overall. Ventrally the two series are similar. Compared to Valley of Mexico birds, Northern Plateau specimens are darker and brighter above, with darker dorsal streaking and a more contrasting patterning, especially on the occiput. Northern Plateau specimens are distinctly darker, richer, and more contrastingly marked above than the two Puebla specimens, with darker and broader streaking and greater buff ventrally. Compared to Great Basin specimens, those from Northern Plateau are notably darker and more reddish (less grayish) brown above, with darker brown, broader, and more extensive dorsal streaking (especially on the crown); buffier crown and superciliary stripes and back edgings; darker and broader rufous wing edgings; and broader, darker, and more extensive ventral streaking.

Breeding plumage: Northern Plateau specimens are similar to Lerma and Valley of Mexico birds, but tend to be more richly brown above and with heavier dorsal streaking, especially on the crown. Northern Plateau birds are distinctly darker and more richly brown above compared to Puebla specimens, with streaking more pronounced throughout. Compared to Guatemalan birds, those from Northern Plateau average somewhat darker on the upperparts, and the dorsal and ventral streaking is generally darker and more extensive.

Comments

I include here specimens from as far south as Nayarit, which almost certainly represent breeding birds, having been collected in late May. Some specimens of the Lerma series also approach Northern Plateau specimens (e.g., GTO, Yuriría—♀, 8 May 1958), but whether these represent breeding birds or possible migrants is not presently known.

SOUTHWEST

Specimens

Autumn-winter: *Arizona*: Apache Co., White Mountains and vicinity (Sheep Crossing, Basin Lake, Springerville)—2 ♀♀, ♂, 4 September 1953 and 9 September 1934. *Colorado*: Adams Co., Barr Lake and Barr—5 ♀♀, 4 ♂♂, 22 August–13 September 1936 and ♀, 9 September 1909;

Jackson Co., N. Platte River—3 ♂♂, 31 August 1913; Jackson Co., Mt. Zirkel—3 ♂♂, 13 September 1913; Park Co., Buffalo Creek—3 ♂♂, unsexed, 9 September 1956; Douglas Co., southwest of Woolhurst—♂, 6 September 1913.

SPRING-SUMMER: *Arizona*: Apache Co., White Mountains and vicinity (Big Lake, Marsh Lake, Becker Lake, Springerville)—4 ♂♂, ♀, 24 June–5 August 1914; 3 ♂♂, 2 ♀♀, 7 June–10 August 1915; ♂, ♀, sex?, 8–10 June 1934; ♀, 14 July 1954. *New Mexico*: Rio Arriba Co., Burford Lake—2 ♀♀, ♂, 23 May 1971; Rio Arriba Co., 11.5 miles northeast of Chama—♀, 14 August 1952; Taos Co., Taos—♀, ♂, 14 July 1904; Colfax Co., 3–5 miles south of Eagle Nest—2 ♂♂, 1 August 1940; Maxwell area—3 ♂♂, 17 May–21 June 1971. *Colorado*: Grand County, Sulphur Springs—♂, 1 June 1909; Denver Co. (Berkeley Lake)—♂, 9 May 1903; Summit Co., Breckenridge—♀, 15 June 1890; Jackson Co., Walden—♂, 15 August 1936.

Description

AUTUMN PLUMAGE: Upperparts light grayish brown to medium olive-brown, streaking medium to dark brown, generally moderate in width and extent; edgings of back light buff to pale brown; crown and superciliary stripes pale buff to light brown, tinge of yellow over eye; wing edgings light to medium rufous, giving way sometimes to pale gray or whitish; ventral streaking medium brown, narrow, and light to moderate in extent; buff of breast and sides pale and limited in extent.

BREEDING PLUMAGE: Upperparts somewhat grayer brown than above, with streaking and edges of dorsum more prominent; ventral streaks grayer (less brownish) and generally narrower.

Comparisons

AUTUMN PLUMAGE: Compared to Northern Plateau birds, those from the Southwest are distinctly paler and more grayish (less reddish) brown above, with grayer brown dorsal streaking that is less extensive, especially on the crown; the edgings of the back are grayer (less buffy), the wing edgings paler rufous, and the head less bright and less contrasty. Compared to Lerma specimens, they are notably more grayish (less reddish) brown, with grayer brown dorsal streaking, white or grayer (less buffy) edgings on the back, and paler rufous wing edgings. The Southwest series is similar to that from the Valley of Mexico, but the latter is somewhat browner (less grayish brown) above and in its streaking. The Puebla birds are more similar yet to the series from the Southwest, but the former are slightly grayer in their upperpart color and dorsal streaking and have the latter somewhat less extensive than in the Southwest series. Compared to Great Basin birds, the Southwest series is distinctly darker and more brownish (less grayish brown) in upperpart color and dorsal streaking and has the ventral streaking somewhat darker.

Breeding plumage: Compared to Northern Plateau specimens, the Southwest species are generally grayer and duller (less brightly reddish) brown in upperpart color and streaking (the latter also is less pronounced, especially on the head) and tend to have the ventral streaking paler and narrower. Compared to Lerma and Valley of Mexico specimens, those from the Southwest are generally grayer (less reddish) brown in the upperpart color and dorsal streaking (with the latter usually less extensive); the ventral streaking is paler and less pronounced. Southwest specimens are quite similar to the grayer Lerma specimens and those from Puebla, although from the latter they tend to differ in having the central streaking heavier and broader. Compared to Great Basin specimens, those from the Southwest are generally darker and less grayish (more brownish) in upperpart color and dorsal streaking, with the light edging of the back less contrasting and the ventral streaking averaging darker. Guatemalan specimens differ from Southwest specimens in being darker and ruddier brown above, with the streaking more extensive and darker; the yellow of the superciliary also tends to be darker and more extensive.

Comments

Certain Colorado autumn-plumage specimens show varying degrees of approach toward Great Basin specimens, although on the average the series of 21 specimens is more similar to Southwest (Arizona) than to the California-Nevada birds. Some of the Great Basin type do occur in the Colorado series (e.g., North Platte River—2 ♂♂, 31 August 1913), but other specimens are of a dark extreme that even shows an approach to Durango birds (e.g., Buffalo Creek, 2 ♂♂, 9 September 1956). This tendency toward rather dark and more rich coloration is also found in Idaho, as in a series from Fremont County (6 ♀♀, ♂, 17–31 August 1930), where five of the specimens differ slightly and two differ distinctly from the Great Basin series in that direction. The tendency toward darker and more richly colored birds appears to extend even farther north in the Rockies and vicinity, as evidenced by the findings of Peters and Griscom (1938).

As already mentioned, among the populations treated to this point, only those of the United States are known to be migratory. Of particular interest in this regard are two specimens that appear to represent migrants from the rather distinctive Southwest population: Arizona, Tucson—♂, 1 January 1938, and New Mexico, Mora Co., La Cueva Ranch —♀, 20 April 1940. The Arizona specimen has been identified elsewhere (Phillips et al., 1964:192) as *A. s. alaudinus,* a California coastal race, but Phillips has corrected the identification (pers. comm.) and I concur. I have seen two other specimens that may represent Southwest birds, but both are so old and foxed as to be only tentatively identifiable: Texas, Ft. Clark—♀, 2 April 1898, and Texas, locality?—♀, 11 January 1880.

MENSURAL COMPARISONS

Mensural comparisons (Table 1) reveal that in wing length, culmen from nostril, and bill depth at the base considerable overlap exists be-

Table 1: Measurements of Breeding Ground Savannah Sparrows

Samples	Sex	Wing Length			Culmen Length			Bill Depth			Body Weight		
		N	*Mean* (*range*)	*SD*	*N*	*Mean* (*range*)	*SD*	*N*	*Mean* (*range*)	*SD*	*N*	*Mean* (*range*)	*SD*
Guatemala	♂♂	2	68.5 (68.0–69.0)	——	2	7.5 (7.4–7.6)	——	2	5.6 (5.5–5.7)	——		————	
	♀♀	3	64.0 (62.5–65.5)	——	2	7.2 (6.8–7.6)	——	1	5.6 (———)	——		————	
Puebla	♂♂	10	71.0 (68.0–74.0)	1.9	11	7.7 (7.3–8.5)	0.3	10	5.5 (5.2–6.1)	0.3	1	17.5 (———)	——
	♀♀	8	66.8 (64.5–69.5)	1.8	5	7.7 (7.2–8.2)	0.3	4	5.2 (4.9–5.5)	——	4	17.4 (14.9–18.9)	——
Valley of Mexico	♂♂	12	70.2 (66.5–74.5)	2.4	4	8.1 (7.8–8.8)	——	1	5.0 (———)	——	6	18.6 (17.0–19.8)	1.2
	♀♀	7	65.3 (64.5–67.0)	0.9	6	7.6 (6.9–8.0)	0.4	5	5.3 (5.0–5.6)	0.2	4	17.9 (16.2–19.6)	——
Lerma	♂♂	8	68.9 (64.5–72.0)	2.3	6	7.7 (7.2–8.6)	0.5	4	5.7 (5.4–5.9)	——	7	19.2 (18.1–20.2)	0.8
	♀♀	15	66.4 (64.0–69.0)	1.7	10	7.7 (7.2–8.1)	0.4	9	5.5 (5.3–5.8)	0.2	6	17.8 (15.8–20.2)	1.5
Northern Plateau	♂♂	24	69.1 (66.0–72.0)	1.4	24	7.7 (7.1–8.5)	0.3	22	5.4 (5.1–5.6)	0.2	17	17.6 (15.0–20.0)	1.3
	♀♀	9	65.1 (63.5–67.5)	1.4	9	7.7 (7.5–8.1)	0.3	7	5.3 (5.1–5.7)	0.2	5	15.6 (14.0–17.0)	1.1
Southwest	♂♂	20	71.1 (67.5–74.5)	1.7	11	7.7 (7.4–8.2)	0.2	8	5.4 (5.2–5.8)	0.2	5	17.5 (16.0–19.0)	1.2
	♀♀	8	66.8 (64.0–69.0)	1.7	5	7.4 (7.0–7.8)	0.3	5	5.3 (4.8–5.5)	0.3	5	16.6 (16.0–17.3)	0.6
Great Basin	♂♂	19	70.1 (68.0–74.0)	1.5	19	7.6 (7.1–8.5)	0.4	13	5.2 (4.9–5.5)	0.2		————	
	♀♀	7	66.2 (64.0–68.0)	1.6	8	7.5 (6.7–8.2)	0.5	7	4.8 (4.4–5.1)	0.2		————	

Wing length (chord), culmen (from nostril), and bill depth (at base) are in millimeters; body weight is in grams.

tween all populations and means are similar throughout. Mann-Whitney U tests (Steel and Torrie, 1960) of selected samples show that no significant differences exist among the means of the characters ($P > .05$). In body weight average differences exist among some samples, with Valley of Mexico and Lerma specimens being the heaviest. Again, Mann-Whitney U tests revealed no significant differences among samples.

Within samples mean wing lengths of males are 2.6 to 4.9 mm. greater than those of females, and in comparisons the differences between the sexes are significant ($P < .05$). There are also slight differences in weight, with females averaging lighter; but only in the Durango series is the difference significant ($P < .05$). Perhaps with larger series of weights the other samples might also have shown a significant difference in the weight of the sexes.

Table 2: Indices of Separability (See Text) of Breeding Ground Savannah Sparrows (Expressed as Percentages)

	GUATEMALA	PUEBLA	VALLEY OF MEXICO	LERMA	NORTHERN PLATEAU	SOUTHWEST	GREAT BASIN
Guatemala							
A (0)	----	----	----	----	----	----	----
B (5)	----	100.0	85.0	61.4	77.6	93.3	100.0
Puebla							
A (2)	----	----	90.7	100.0	100.0	83.3	61.1
B (11)	100.0	----	90.9	91.5	98.9	71.7	83.4
Valley of Mexico							
A (6)	----	91.7	----	83.5	97.6	66.7	85.7
B (4)	85.0	90.9	----	53.5	91.2	61.1	90.9
Lerma							
A (7)	----	100.0	83.3	----	79.6	85.7	100.0
B (14)	61.4	91.5	53.5	----	68.4	71.4	96.1
Northern Plateau							
A (7)	----	100.0	97.6	79.6	----	95.2	100.0
B (17)	77.6	98.9	91.2	68.4	----	93.5	99.3
Southwest							
A (6)	----	83.3	66.7	85.7	95.2	----	76.3
B (9)	93.3	71.7	61.1	71.4	93.5	----	77.8
Great Basin							
A (9)	----	61.1	85.7	100.0	100.0	76.3	----
B (11)	100.0	83.4	90.9	96.1	99.3	77.8	----

A = autumn plumage; B = breeding plumage. Numbers in parentheses are sample sizes.

In summary, slight mensural differences existing between populations are not significant at the .05 level (and generally not at the .01 level). On the other hand, males are significantly longer winged than females in all samples, and in the Northern Plateau sample males are heavier than females.

DISCUSSION

Breeding populations of Savannah Sparrows of the inland Southwest, Mexico, and Guatemala differ *inter se* in coloration but not mensurally, except perhaps in weight. Succinctly, the seven populations studied here can be segregated into four coloration types: *pale* (Great Basin, Puebla), *moderately dark* (Southwest, Valley of Mexico), *dark* (Lerma, Guatemala), and *very dark* (Northern Plateau). In general, adjacent populations tend to form clines of increasing or decreasing darkness, although between the Southwest and Northern Plateau and especially between Puebla and Guatemala the transition is quite stepped.

For the purpose of delimiting subspecies among these populations, I have used an index of separability (Table 2). To calculate the index, I compared each specimen in a sample with each in another sample. Then the total number of specimens that were separable in the two was divided by the overall total of comparisons. For example, in comparing the five Guatemala birds with the 11 from Puebla, I found that all were separable. Thus I divided that total of separable birds (5 × 11, or 55) by the overall total of comparisons (also 5 × 11, or 55), for an index separability of 100 percent. The indices of separability (Table 2) among adjacent populations can be summarized as follows (autumn plumage index and breeding plumage index):

Great Basin from Southwest	=	76.3	and	77.8%
Southwest from Northern Plateau	=	95.2	and	93.5%
Northern Plateau from Lerma	=	79.6	and	68.4%
Lerma from Valley of Mexico	=	83.5	and	53.5%
Valley of Mexico from Puebla	=	90.7	and	90.9%
Puebla from Guatemala	=	–	and	100.0%

In order to apply these indices, I have used a form of the "75 percent rule" suggested by Mayr et al. (1953); i.e., to be worthy of recognition subspecies should differ by about 75 percent from about 100 percent in compared samples. This is equivalent to about 90 percent inter-sample separability, which is the level at which the indices above are gauged. On this basis, one finds that four groups emerge as potential subspecies, i.e., are 90 percent or greater in their separability. These are the Great Basin-Southwest, the Northern Plateau-Lerma-Valley of Mexico, the

Puebla, and the Guatemala samples or groups of samples. Of these, the highest degrees of separability among adjacent samples are between the Puebla and Guatemala samples (100 percent of breeding birds) and between the Southwest and the Northern Plateau samples (95.2 of autumn and 93.5 percent of breeding birds). The level of separability between the Valley of Mexico and Puebla samples (90.7 of autumn and 90.0 percent of breeding birds) is borderline, and I will discuss that situation further on. For the moment, we can accept three definite groups as meriting subspecific recognition, and for each a name is already available.

For the Guatemala population the name *A. s. wetmorei* (van Rossem, 1938), type locality Hacienda Chancol, Department of Huehuetenango, is applicable, as is *A. s. nevadensis* (Grinnell, 1910), type locality Soldier Meadow, Humboldt County, Nevada, for Great Basin birds. For the populations from the Valley of Mexico to the Northern Plateau, two names have been applied: *A. s. brunnescens* (Butler, 1888), type locality Valley of Mexico, and *A. s. rufofuscus* (Camras, 1940), type locality Babicora, Chihuahua. As already mentioned, the lectotype of *brunnescens*, selected by Peters and Griscom (1938), agrees more with Lerma birds than with those from the Valley of Mexico in its characters. However, as no question exists of these two populations being subspecifically separable, the exact origin of the type does not matter—the name *brunnescens* is applicable regardless. Furthermore, the Northern Plateau population, to which *rufofuscus* was originally applied, must also be included in *brunnescens*, as the former sample and that from Lerma are not subspecifically distinguishable.

The name *rufofuscus* has also been extended to the breeding birds of Arizona and New Mexico (Duvall, 1943) and recently by Allan R. Phillips to those of parts of Colorado (Bailey and Niedrach, 1965). However, my study places these populations closer to Great Basin *nevadensis*, although as a whole the Southwest sample is an intergrade population, between that race and *brunnescens (sensu lato)*.

Actually, in some ways the Southwest population is distinctive, although the index of separability shows that its recognition as a separate race would be unjustified. Undoubtedly this distinctiveness is what led Duvall and, later, Phillips to ally the birds with Mexican populations, and it is clear that Peters and Griscom (1938) were also aware of this variational trend. I say "aware" advisedly, because for unknown reasons those authors did not even mention Arizona and New Mexico breeding birds (which were certainly available); however, they did detect the browner tones in birds from Colorado to Montana and Idaho. They even singled out birds from the eastern slope of the Rockies (Colorado and Montana) as being very similar to the northerly *anthinus* (type locality on Kodiak Island, Alaska), although their final assessment was to call them minutely nearer *nevadensis.* Because they were unaware of the situation in Arizona and New Mexico, and in the absence of data on the yet-to-be-discovered breeding birds of Durango and Chihuahua, their taxonomic assessment is understandable. They also faced a dilemma in that had they called Rocky Mountain birds *anthinus,* the range of that race would have been disjoined (in at least southern British Columbia) and would in turn have disjoined Great Basin *nevadensis* from that of the Great Plains. (Peters and Griscom rejected the naming of Great Plains birds as a distinct race, i.e., *campestris* Taverner [1932]). Their nomenclatural course of action avoided these disjunctions, but the fact remains that Rocky Mountain populations are browner than those to the east and west—regardless of what one chooses to call them. I have already expressed my preference as *nevadensis* toward *brunnescens,* but eventually a population-by-population review of more northerly birds will be needed to elucidate possible links with *anthinus.*

The final matter to discuss is possible subspecific status for the Puebla population. As already mentioned, the index of separability of this sample compared to the adjacent Valley of Mexico (*brunnescens*) population is about 90 percent. This level is right on the borderline of acceptance, and in view of this fact and the small samples that were available, I opt for a conservative approach and retain Puebla birds in *brunnescens.* With additional material, perhaps the present index of separability level can be accepted or might improve and a new race could be described

SUMMARY

The geographic variation in breeding or resident Savannah Sparrows of the inland Southwest, Mexico, and Guatemala was studied. No mensural differences were found among populations, but color differences exist, mainly in the darkness and hue (grayish to reddish) of the upperparts and the streaking of the adults. Juveniles were not widely available, but at least in the Great Basin these appear to be quite variable. I recommend the recognition of three subspecies: *wetmorei* (van Rossem) of Guatemala, *brunnescens* Butler of Mexico (which includes *rufofuscus* [Camras] and provisionally the pale birds of Puebla), and *nevadensis* (Grinnell) of the Great Basin and the Southwest (the latter area actually intergrades toward *brunnescens*).

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A REVISION OF THE RUDDY KINGFISHER, *HALCYON COROMANDA* (LATHAM)

John P. Hubbard
and
John E. duPont

INTRODUCTION

The Ruddy Kingfisher, *Halcyon coromanda* (Latham), breeds from India and Japan southward to Sumatra, Java, and the Celebes, with northern populations at least partially wintering in more southern areas. The first reviser of the species was Oberholser (1915), who recognized the races *coromanda, major* (Temminck and Schlegel), *minor* (Temminck and Schlegel), and *rufa* Wallace, as well as describing as new *bangsi, ochrothorectis, neophora, pagana,* and *mizorhina.* Peters (1945) synonymized *neophora* and *pagana* with *minor* but otherwise accepted Oberholser's treatment, plus Neumann's (1939) new race, *pelingensis.* Mees (1970), in the latest review of the species, described as new the race *sulana* and accepted all the pre-1915 races, plus *bangsi* among more recently described forms. Mees' limited review was based entirely on material in the Leiden Museum, although this does include several of the types. Our revision is based on all the material we could find in the United States, plus the type series of *mizorhina* from the Royal Ontario Museum. Our series totaled 248 specimens, of which 137 were presumably from their breeding grounds.

As the result of our study, we accept as valid eight of the previously described races of this species, and we name two additional ones. The adults of all of these are illustrated in Figures 1 and 2, along with the immatures of two of the forms; ranges are shown in Map 1. As we will be referring to various of the subspecies by name and/or range before we discuss each in detail, the following list is presented in order to facilitate the reader's understanding of our discussion. We should add that we are generally following the *Times of London* (1967) for names and spellings of localities. Where we list specimens examined by us, we give usu-

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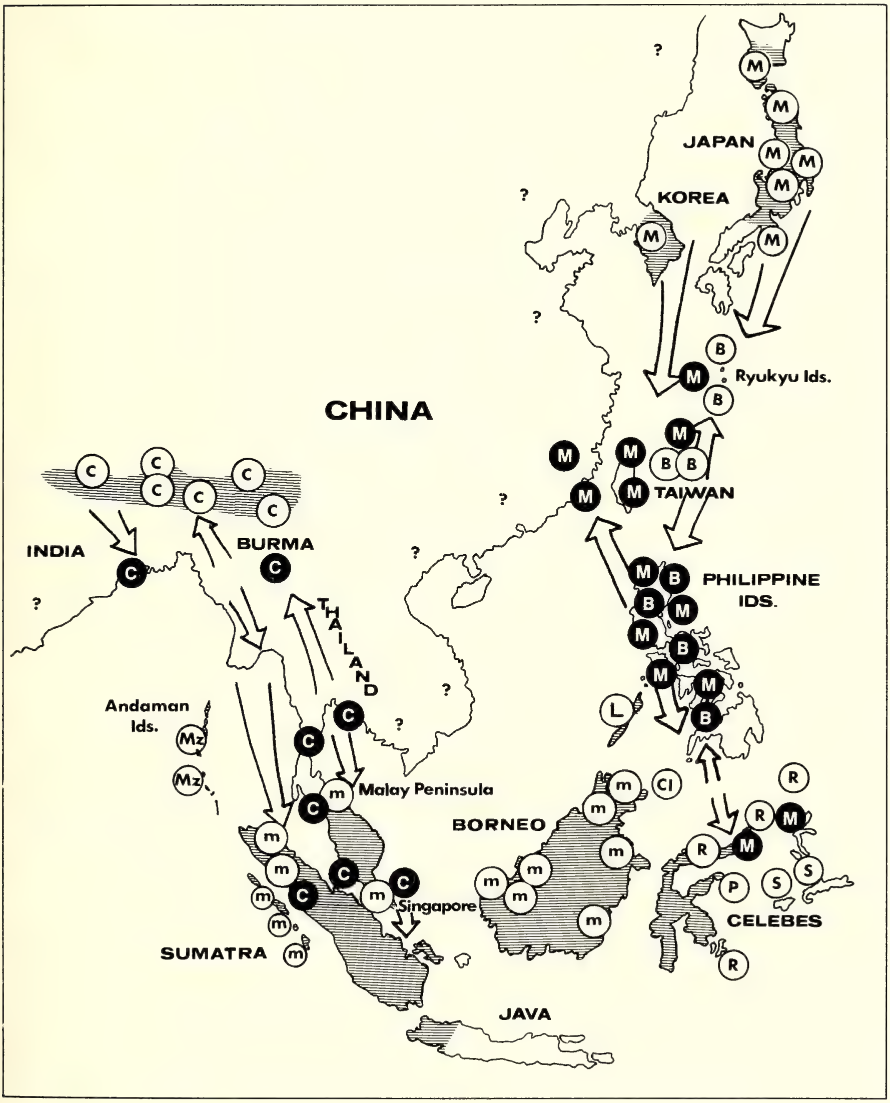
ally only the revised place names, but in quoting we give both the original and the revision. The races that we recognize and their general ranges are:

coromanda (Indian region and Burma; migrates south at least to Sumatra)
major (Japan, Korea, and China[?]; migrates south to Celebes)
bangsi (Ryukyu Islands; migrates south to Philippines and vicinity)
mizorhina (Andaman and Nicobar[?] Islands; resident)
minor (Sumatra, Borneo, Java, and Malaya; resident)
rufa (Celebes and vicinity; resident)
pelingensis (Peleng Island—east of Celebes; resident)
sulana (Sula Islands—east of Celebes; resident)
claudiae (Tawi Tawi Islands in Sulu Archipelago; resident)
linae (Palawan; resident)

Several other names have been applied to this species, including emendations and several synonyms. These are given in Oberholser (1915), but for completeness we list them here. Under the nominate race are *coromandelicus* Vigors, *lilacina* Swainson, *calipyga* (Hodgson), *coromandra* Gray, *coromandeliana* ("Scopoli") Gray, *coramander* Blyth, and *callipyga* Sharpe. Under *major,* Oberholser lists *schlegeli* Bonaparte. Except for these and those listed above, we know of no other names applied to *Halcyon coromanda.*

RANGE

Although the general distribution of this species is satisfactorily known, the breeding and migrational ranges are not well elucidated. The breeding distribution is especially poorly known, apparently because of the inconspicuousness of the species, its predilection for wooded areas, and, at least in some areas, its rarity. Eggs have been recorded from Japan and apparently the Ryukyu Islands (Austin and Kuroda, 1953:482), and Indian region (Ali and Ripley, 1970:88), and Labuan Island, Borneo (Smythies, 1960:303–304). The Labuan Island record, in May, is questioned by Smythies, as the nest was described as a pendulous structure also containing bees (possibly a hole in a wasp nest?). The Japanese breeding records are mainly from June and July, and the nests are in holes in trees. In the Indian region the dates of breeding are given mainly as March–April, with nests in burrows and sometimes holes in trees. In addition, we have seen nestlings from Assam, taken on 16 June; Borneo (no date); and Butung Island (southeast of Celebes), 16 July. Mees (1970) also reports a "juv." taken at Bangka Island (south-



Map 1: Distribution of *Halcyon coromanda*: hatched areas show breeding range, with local subspecies in light circles; migrants are in dark circles (**C** = *coromanda*, **Mz** = *mizorhina*, **m** = *minor*, **R** = *rufa*, **P** = *pelingensis*, **S** = *sulana*, **Cl** = *claudiae*, **L** = *linae*, **B** = *bangsi*, **M** = *major*). Arrows show directions of migration, while question marks (?) indicate that local status is unknown (there are summer records from southern Burma, but we have not seen the specimens to identify them to race).

east of Sumatra) on 11 July. Thus, actual proof of breeding comes only from the Indian region, Japan, Ryukyus, Sumatra region, Celebes region, and Borneo region.

From the preceding data, it appears that these kingfishers breed in both the temperate and the tropical parts of their range in the spring and and summer. Additional evidence of this is that immatures first appear in the two areas about the same time, i.e., August and September. Conservatively, most birds taken in June and July should be on or near their breeding grounds. On this basis additional, probable breeding areas (based on specimens seen by us) would be Korea, Burma (northern part), Palawan, and the Siau and Peleng Islands near Celebes. Additional June–July specimens are listed by Oberholser (1915) from the Celebes proper, by Mees (1970) from the nearby Sula Islands and from Java, and by Sharpe (1892) from southern Burma, Malaya, and Manchuria (one specimen). La Touche (1931:82) also lists summer specimens from Shaweishan Island, at the mouth of the Yangtze River in China, but he specifically noted that these were migrants—an assessment that we cannot refute. Based on our studies of geographic variation, we are relatively certain that the species breeds in the southern Malay Peninsula, on the Andaman Islands, and in the southernmost Sulu Archipelago (Tawi Tawi Islands).

In sum, the breeding range of this species appears to be the northern Indian region, Burma, the Andaman Islands, the Malay Peninsula, Sumatra and vicinity, Borneo area, Java, Celebes and vicinity, the Tawi Tawi and Palawan Islands, the Ryukyus, Japan, and Korea. The species may also breed in Manchuria and eastern China, but less likely elsewhere (in such areas as Taiwan, the remainder of the Philippines, and Vietnam).

The Ruddy Kingfisher is apparently almost totally migratory in Japan, Korea, and the Ryukyus and at least partially so in the Indian region. This fact has been apparent to some workers, but not to others. For example, in his major revision of the species, Oberholser (1915) regarded all populations as resident—not just those of tropical areas. As a result, his descriptions of new races from the Philippines and from Sumatra included northern birds. Japanese-Ryukyu birds (two races) occur southward to the Celebes, and those from the Indian region (nominate race) occur south at least to Sumatra. Details of migration, as well as more specific information on other parts of the distribution of this species, are discussed under individual subspecies.

MOLTS

Although we did not make a detailed study of the molts of this species, we did make general observations on their extent and timing.

The youngest birds that we examined were nestlings in juvenal plumage; all three individuals (one each from Assam, Borneo, and Butung Island —the latter near Celebes) were already fully feathered. The juvenal plumage is distinguishable from that of adults by the dark barring on the underparts (and sometimes upperparts), and often by the lack of reduction of purple above, the different color of the rump, and other features. The plumage is worn for several months, and northern birds migrate southward in it. For example, we have seen such migrants (at least partially in juvenal plumage) as follows: *major* from the Ryukyus, China (Fukien), the Philippines (Luzon, Guimaras, Sibuyan), and Lembeh Island (near Celebes); *bangsi* from the Philippines (Luzon, Calayan, Siquijor); and *coromanda* from Thailand and Singapore.

The postjuvenal (first prebasic) molt involves most or all of the body plumage, but the wing—apparently including most of the coverts—and tail feathers are retained from the juvenal plumage. There may be average differences in color or texture in these flight feathers that would allow first-year birds to be separated from adults, but we could not verify this in our sample. The molt seems to begin first on the breast, then on the throat and on the hind crown to upper back, and finally on the abdomen and remainder of the upperparts. In *major*, specimens in full juvenal plumage or just beginning breast molt were prevalent in July–October (12 specimens), with a 30 September specimen also showing some new feathers on the crown and back. Single November and December (no specific dates given) specimens are in a similar plumage stage to the latter bird, whereas a 30 December specimen has largely assumed adult plumage—with juvenal barred feathers still present only on the throat, abdomen, and sides. Also generally similar to the last specimen are ones taken on 1 March, 18 April, and 23 May; one dated 9 May from Luzon (FMNH) is mainly in juvenal plumage. Possibly the last specimen is misdated, as its stage of molt is more appropriate for an autumn bird.

Bangsi shows a similar timing in this molt, with most August–October specimens (9) in full juvenal plumage or with new feathers only in the breast region. One October specimen (no specific date) is more advanced, with both the under- and upperparts showing new feathers, including on the rump. A 3 November specimen shows only slight feather replacement; single 24 December and 7 January birds are mainly in adult plumage—with juvenal feathers still evident only on the lower breast, throat, forecrown, lower back, and especially the abdomen.

Of the other races we have seen far fewer specimens, but it appears that the timing of the postjuvenal molt of some is advanced over that of *major* and *bangsi*. Single *coromanda* specimens taken on 1 and 22 October are largely in adult plumage, with juvenal feathers evident mainly on the abdomen; a *rufa* (Celebes) taken in September (no exact date given) is at a similar stage. An immature specimen of *minor* (Borneo region) taken on 19 May already shows some new feathers on the breast and hind crown, and an immature taken on 13 August is somewhat further along in replacement. On the other hand, an immature specimen of *claudiae* (Sulu Archipelago), taken on 1 December, shows a similar timing of molt to *major* and *bangsi*; it has new feathers appearing on the breast, throat, and upperparts.

Adult *H. coromanda* appear to undergo only one molt per year, that being a complete postnuptial (second, etc., prebasic) molt. In general, the replacement of flight feathers is well underway before the body plumage is molted. Replacement of the remiges begins with the innermost pair and progresses outward—a pair or two at a time. In the single case of tail replacement we have seen, the outer feathers are old and the inner ones are missing or in pin stage. In the tropical races *claudiae, rufa, pelingensis,* and *minor,* we detected body molt as early as the replacement of primaries 7 to 5 (counting from the *outside*), whereas in *major* and *bangsi* this did not begin at least until pair 4 was molted. Body molt was found to begin on the breast and the nape to rump regions (including the scapulars), closely followed by the crown, throat, and abdomen.

We saw no postnuptial molt in specimens of northern races (i.e, *coromanda, major, bangsi*) taken on their breeding grounds. At least the last two appear to migrate to the tropics before molting. Some specimens (2 of 12) of those two forms show wing molt in September, and more (9 of 24) in October, but body molt was detected only in specimens (4 of 5) taken in November–January. Of the other forms we had far fewer autumn-winter specimens, but where detected, body molt was generally earlier than in *major* and *bangsi*. For example, specimens of the Borneo-Sumatra race *minor* and the Celebes-area races *rufa* and *pelingensis* were in molt in August–September, with later-taken birds in fresh plumage. On the other hand, in two of three specimens of the Sulu Archipelago race *claudiae,* molt was not seen until September–October, while three Palawan birds (*linae*) were in worn plumage in September, as were four Sula Island birds (*sulana*) in October.

CHARACTERS USED IN ANALYSIS OF GEOGRAPHIC VARIATION

As in previous studies, our analysis of geographic variation in this species included both mensural and plumage characters. Some of these proved of little value in segregating populations at the subspecies level, and we endeavor to discuss them in this section rather than under individual taxa. Mensural characters include several involving the wing (i.e., shape, formula, length of primary 3 versus 2, tip length, and overall length), as well as tail length, culmen size (length and width), and body weight. These will be discussed later and are summarized in Tables 1, 2, and 3. Because we found males and females to be quite similar in measurements, we have combined the values throughout the study. Immatures average smaller in linear measurements than adults and are treated separately in the subspecies accounts.

Plumage characters are almost entirely ones involving differences in hue of coloration, although the extent of the rump patch is also a useful feature. Basically, adults of *H. coromanda* are brown above and paler below, with the upperparts and breast overlaid to various degrees with purplish tones. The rump is marked by a paler patch of variable size, ranging in coloration from blue to white—depending on subspecies and age. Immatures resemble adults but are barred and often lack purple in the plumage, as mentioned under MOLTS; in addition, their rumps are typically bluer than those of the adults. As with measurements, we found that adults did not differ sexually in plumage, thus we have combined them in our comparisons and descriptions (see SUBSPECIES ACCOUNTS). Nongeographic variation in plumage includes that resulting from the time of year that the specimens were collected (seasonal variation) and the length of time the specimens have been in collections (postmortem variation). These aspects are discussed under NONGEOGRAPHIC VARIATION IN PLUMAGE.

MEASUREMENTS

Wing: Although many workers have used wing length in studies of this species, Mees (1970) appears to be the first to treat geographic differences in wing shape. He reported that in *major* primary 3 (counting from the outermost) was the longest, exceeding primary 2 by 2–4 mm. In *coromanda* he found that primary 3 equaled 4 and was about 4 mm longer than 2. In *minor* and *rufa* he found that primary 3 also equaled 4, but was 5–7 mm longer than primary 2. Finally, in *sulana,* he reported that primary 4 was the longest and that 3 was 6–10 mm longer than 2. We have extended his analysis of primary formula and comparison of primaries 3 to 2, and we have added another measurement, i.e., wingtip. The last is the (arc) distance between the tip of the longest primary and the tip of the *outermost* secondary.

Wing Formula: In 102 specimens of adults from the breeding grounds (Table 1), we found that wing formulas in most races varied to some degree, especially where samples were larger. Most variable were *minor* and *rufa*; *coromanda* was among the least variable (as were *sulana, pelingensis,* and *claudiae*—all represented by very small series). In general, the three migratory races (i.e., *coromanda, major,* and *bangsi*) had primary 3 the longest, followed by 2 or 4, 4 or 2, and then 5. One *bangsi* had the formula 4>5>3>2, which is exceptional and more like that of tropical populations. Overall, our findings agree with those of Mees (1970) in this character for *major,* but not for *coromanda.*

In the remaining (southern) races, primary 4 was generally longest, followed in most specimens by 3, 5, and either 2 or 6. An alternate type is where 5 precedes 3, while two specimens each of *minor* and *rufa* had the formula 3>4>5>2. We did not find the condition 3=4, which Mees (1970) claimed to be the formula of *minor* and *rufa.* On the other hand, our data do agree with his for *sulana,* which has primary 4 the longest (as is true of other southern races): In a broad sense, we find that specimens can be separated into two groups on the basis of wing formula: the migratory races with primary 3 longest and the resident races with primary 4 longest.

Length of Primary 3 Versus 2: The values for this are given in Table 2 as "P3>2 by. . . ." Invariably we found that primary 3 exceeded 2 in length, by amounts ranging from 1.5 to 7.5 mm. The mean difference is smallest in *major* and *bangsi*; largest in *sulana, rufa,* and *pelingensis*; and intermediate in other races. Although the trend is clear, i.e., least difference in Japanese-Ryukyu birds and greatest in Celebes-area ones, a great deal of overlap exists—both between individuals and between races. Consequently, we do not regard this character as one of great taxonomic value nor as satisfactorily reflecting such features as roundness of wing.

Table 1: Wing Formulas of Adult *Halcyon coromanda* from Breeding Grounds

		Wing formulas* and percent of specimens with each				
	Sample Size	3>2>4>5	3>4>2>5 3=4>2>5†	3>4>5>2 3=4>5>2†	4>3>5>2 4>3>5>6†	4>5>3>2 4>5>3>6†
major	16	62.5	37.5			
bangsi	22	9.1	86.4			4.5
coromanda	9	100.0				
mizorhina	1				100.0	
sulana	4				100.0	
rufa	9			22.2	66.7	11.1
pelingensis	5				100.0	
claudiae	3				100.0	
linae	13				84.6	15.4
minor‡	20			10.0	65.0	25.0

* Formulas are in the order of decreasing primary length, with the outer primary numbered as 1.

† Rarer than above formula.

‡ Borneo area, Sumatra, Mentawei Ids.

Wingtip (and Wing) Length: We used the wingtip measurement in our study in an attempt to evaluate the degree of roundness in the wings of different populations. While Mees (1970) raised the point about relative wing shape in races, his use of neither wing formulas nor measurements of primary 3 versus 2 really allows its assessment. In Table 2 one can see that measurements of wingtip (arc) are absolutely greater in longer-winged (arc) populations than in shorter-winged ones. Thus, *major* and *bangsi* are longest in wingtip and *linae* and *minor* smallest. Interesting is the fact that the three migratory races all average longer in wingtip than do resident races, even though several of the latter overlap

Table 2: Wing Measurements of Adult *Halcyon coromanda from Breeding Grounds**

	Length (mm)			Wingtip (mm)			Wingtip Ratio†	P3>2 by (mm)		
	$\bar{x}$	s.d.	range	$\bar{x}$	s.d.	range	(%)	$\bar{x}$	s.d.	range
major (n=16)	121.8	2.6	117.0–126.0	32.6	1.2	30.5–35.0	26.8	2.8	0.9	1.5–5.0
bangsi (n=23)	120.4	2.6	115.5–125.5	30.6	1.6	27.5–34.0	25.4	3.8	1.1	2.0–6.5
coromanda (n=13)	112.9	2.9	108.0–118.0	28.0	3.3	21.0–31.0	24.8	4.4	1.0	3.0–6.5
mizorhina (n=1)	115.0	—	——	26.5	—	——	23.0	5.5	—	——
sulana (n=4)	119.4	1.7	117.0–121.0	26.6	2.5	24.5–30.0	22.3	6.2	0.2	6.0–6.5
rufa (n=13)	113.4	2.2	110.0–116.0	24.2	2.6	20.0–29.0	21.3	6.1	0.9	4.5–7.0
pelingensis (n=4)	110.4	1.4	108.5–112.0	23.0	1.6	21.5–25.0	20.8	6.5	1.2	5.0–7.5
claudiae (n=4)	107.2	2.1	105.0–109.5	20.0	1.8	18.0–22.0	18.7	4.5	0.6	4.0–5.0
linae (n=15)	102.2	2.3	97.0–106.0	19.9	1.8	17.0–23.0	19.5	5.1	0.7	4.0–6.0
minor										
Borneo (n=19)	99.9	2.4	94.5–103.0	20.2	1.7	17.5–23.5	20.2	4.9	1.1	3.5–7.5
Sumatra (n=4)	101.2	1.3	100.0–103.0	20.9	1.7	19.5–23.0	20.6	5.1	0.2	5.0–5.5
Mentawei Ids. (n=7)	105.4	2.7	100.5–108.0	21.4	2.4	18.5–24.5	20.3	5.2	1.2	3.5–6.5

* Sexes lumped.

† Mean wingtip length over mean wing length.

in mean wing length with *coromanda.* To assess this relationship, we calculated the ratio of mean wingtip to mean wing length in each population (Table 2). This showed that northern races had wingtips averaging 24.8 to 26.8 percent of wing length, while southern ones had them 18.7 to 22.3 percent (the one *mizorhina* was 23.0 percent). This indicates, as Mees (1970) suggested, that the wing is more pointed in migratory races. We should add that we have not computed means and variances for this ratio, as Corner Tests (Steel and Torrie, 1960) reveal that wingtip and wing length are not correlated. Thus one is not justified in using ratios other than for the very general purpose of pointing out trends. The lack of correlation means that measurements should be treated separately, which we do in this study. In that wing length is an easier measurement to make accurately than wingtip, we emphasize the former in our revision.

In conclusion, there is geographic variation in wing shape (and length) in *Halcyon coromanda.* Northern, migratory races tend to have primary 3 the longest, to have less difference in length between primaries 3 and 2, and to have more pointed wings. Southern resident races tend to have primary 4 the longest, to have a greater difference between 3 and 2, and to have more rounded wings.

***Tail Length*:** Although tail length correlates with wing length *within* populations (in Corner Tests), from area to area it does not. For example, the longest-tailed birds are *sulana,* although these are the third longest-winged (Table 3). In spite of overlap, tail length is a useful measurement in segregating populations, particularly those with the longest and the shortest values.

***Culmen*:** We measured both culmen length (from the anterior part of the nostril) and width (at base of the mandible, between the rami). Our figures (Table 3) do not reveal any major differences in means of either measurement, although there are several significant geographic trends. In length, the largest race is *mizorhina* (one specimen), followed by *sulana* and *claudiae*; all other races average shorter billed and in the same general range of values. In width, *sulana* has the largest bill, with *linae, minor,* and *coromanda* the smallest and the remaining races in between.

Based on our analysis, we find the bill measurements do not provide generally useful means of segregating populations of these kingfishers, although at least in culmen length some sorting is possible (e.g., larger-billed races). It should also be kept in mind that inherent difficulties exist in measuring culmen length; these include both the tendency for blunting and for overgrowth to occur in the bills of different individuals. Also, there may be a differential growth factor involved, in that full size in bill may not be obtained even after adult plumage is acquired; certainly immatures show smaller bill size for some months after they fledge. Examination of the bills of adults in different populations suggests that geographic differences do exist in this character, particularly in the degree of inflation. Although we are not able to quantify (and hence accurately convey) the extent of these differences, we would point them out by ranking races as follows (in order of increasing inflation): *major, bangsi, coromanda, mizorhina, minor, linae, claudiae, pelingensis, rufa,* and *sulana.*

Weight: Body weight would probably be the best index of size in this species, but unfortunately too few data are available for any meaningful comparisons. The only race for which we have more than one weight is *major*: two breeding ground adults weighed 93.5 and 100.0 g,

Table 3: Tail and Culmen Measurements of Adult *Halcyon coromanda from Breeding Grounds**

	Tail length			Culmen length (from nostril)			Mandible width (at base)		
	$\bar{x}$	s.d.	range	$\bar{x}$	s.d.	range	$\bar{x}$	s.d.	range
major n=16	67.9	1.8	65.0–71.0	45.2	1.8	42.0–47.9	16.9	0.6	16.1–18.0
bangsi n=23	72.9	2.0	68.5–76.5	44.8	1.9	41.0–47.6	16.8	0.6	15.7–17.6
coromanda n=13	62.3	2.0	60.5–67.5	46.3	1.9	43.8–48.8	16.5	0.7	15.0–17.5
mizorhina n=1	67.0	—	———	51.6	—	———	17.4	—	———
sulana n=4	82.4	2.0	79.5–84.0	49.7	1.0	48.9–50.8	18.2	0.9	16.9–18.9
rufa n=13	66.9	1.8	65.5–69.5	47.8	1.8	44.8–51.5	17.4	0.5	16.5–18.2
pelingensis n=4	66.0	—	64.5–67.5	46.3	2.4	42.8–48.5	17.2	0.7	16.7–18.1
claudiae n=4	64.5	0.8	63.5–65.5	49.0	—	47.8–50.2	17.3	0.7	16.5–18.1
linae n=15	59.5	1.6	56.5–61.5	45.1	1.0	43.3–47.3	16.3	0.5	15.3–16.8
minor									
Borneo n=19	58.2	1.2	55.5–60.0	45.9	1.2	41.3–49.2	16.5	2.1	14.8–17.7
Sumatra n=4	57.9	0.7	57.5–59.0	46.0	1.2	44.4–47.2	16.5	0.4	16.0–16.8
Mentawei Ids. n=7	60.1	2.8	57.5–63.5	45.7	1.4	43.8–47.5	16.5	0.5	15.9–17.2

* Sexes lumped.

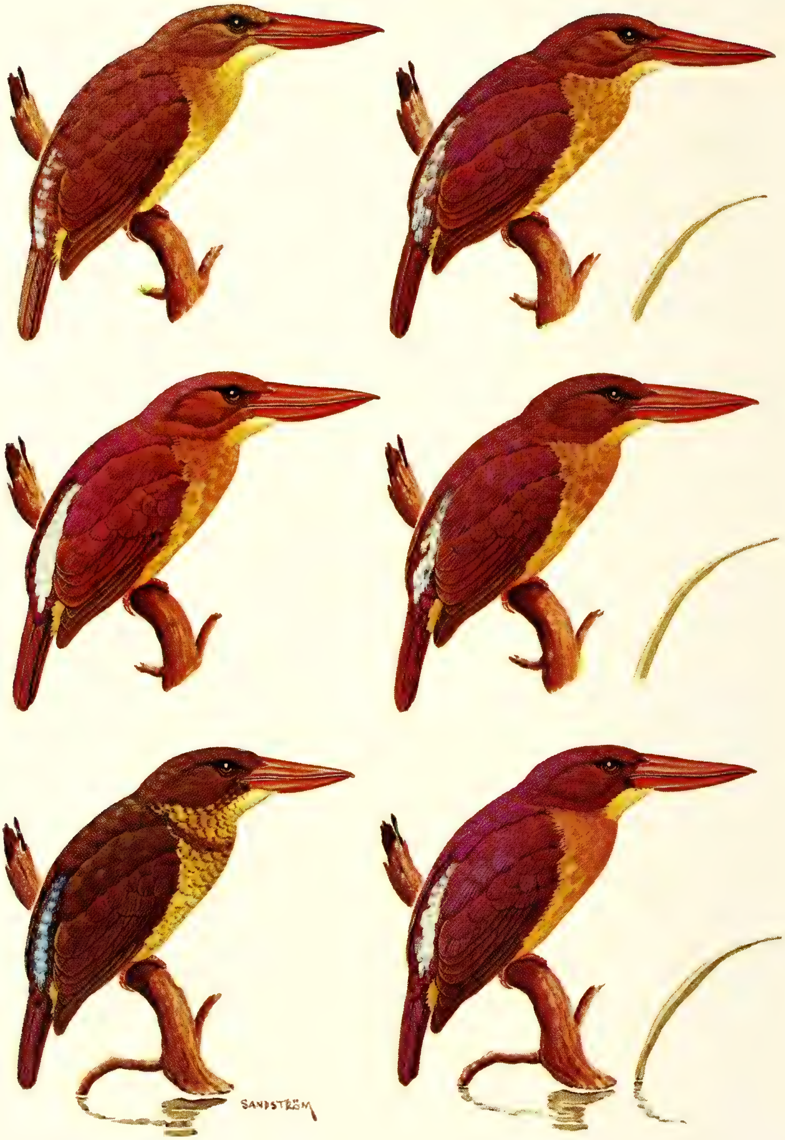


Figure 1: Subspecies of *Halcyon coromanda* (part). Top (left to right) = *major, coromanda.* Middle = *sulana, bangsi.* Bottom = *bangsi* (immature), *mizorhina.*

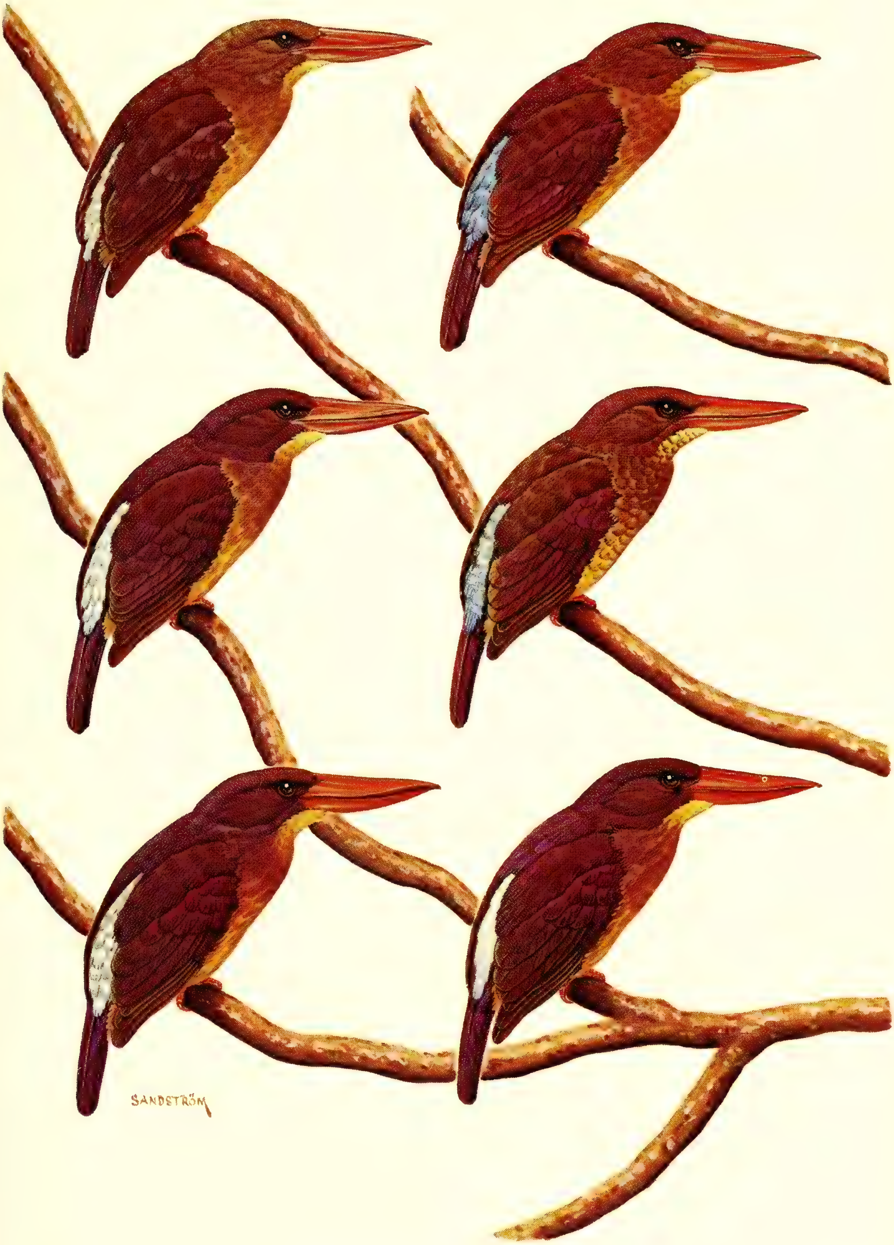


Figure 2: Subspecies of *Halcyon coromanda* (part). Top (left to right) = *pelingensis, rufa.* Middle = *minor, claudiae* (immature). Bottom = *claudiae, linae.*

whereas six migrants averaged 99.6 ±12.5 g (range 81.3 to 112.3 g). Other weights, all of adults on the breeding grounds, are *coromanda*, 70.0 g; *claudiae*, 98.0 g; and *linae*, 73.5 g. Obviously more data are needed, but from these it appears that linear measurements and body weight are not absolutely correlated in this species. At least, birds with shorter wings and tails overlap or approach in weight those with longer wings and tails.

NONGEOGRAPHIC VARIATION IN PLUMAGE

Seasonal Variation: With wear through the year, adults of ***H.*** *coromanda* show a progressive diminution of purple coloration and an increase in browns, as the feather edgings wear off to expose underlying coloration. Wear may be especially prominent on the head and abdomen —probably because of the plumage rubbing against the nest cavity in the breeding season. The plumage also tends to become paler with wear, and summer and early autumn specimens can be quite washed out in coloration. We have too few immatures to discern their seasonal color changes.

Postmortem Variation: Recently taken birds tend to be slightly darker and richer colored than older birds, *in series*. The differences within older or recent series are great, however, and some specimens within them may approach or equal those in the other in coloration. Thus one finds considerable individual variation in specimens, which in part offsets that reflecting length of time in collections. On the whole, well-cared-for specimens taken even as long ago as the late 1800s still show populational characteristics of more recent material.

SOFT-PART COLORATION

Color data recorded on labels suggest that the reddish bill and feet of adults are somewhat different in color, the latter being slightly duller. The bill color is given as various shades of orange-red, the feet similar but less reddish, and the nails as pale to blackish brown (same in young). The eyelid is given as red in *coromanda* and *minor*, this color presumably applying also in other races. Eye color is given as various shades of brown. Young birds appear to have blackish, dusky, or brownish bills and dull feet, these becoming like those of adults in autumn or winter. Foot color in juveniles and immatures was given as "fleshy purple" (*coromanda*), "pale brownish vermilion" (*rufa*), and blackish brown with orange posteriorly and on the toes (*bangsi*). The bill appears to change to orange beginning at the tip; the eyes are dark or gray-brown.

Colors of the bill, legs, and feet of adults fade after death, although this may require years. As a rule, the bills of specimens become dull yellow after 25 years, although some areas of orange—especially along the culmen ridge—were detected in specimens taken as long ago as 1916. Birds taken in 1945-1949 showed mostly yellow bills, whereas those from 1960-1963 were mainly light orange, and those from 1969-1972 were dark reddish orange. Feet change more rapidly, and those of birds collected as recently as 1969 are dull yellow or only slightly orangish.

SUBSPECIES ACCOUNTS*

Halcyon coromanda coromanda **(Latham, 1790)**

[*Alcedo*] *coromanda* Latham, Index Ornith., Vol. 1, 1790:252 (not seen). "Coromandela" [India] (*contra* Oberholser, 1915:643; see Whistler and Kinnear, 1935:763, and Peters, 1945:194). Location of type specimen, if extant, not known.

Description: A rather pale race, with a moderately long wing and wingtip and rather short tail.

Adult—Upperparts Chestnut† with rufous tone, paler on cheeks and overlaid with a light Phlox to dark Rose Purple on the back, nape, lower tail coverts, sides of neck, lesser wing coverts, and (in some birds) hind crown. Wings and tail more Chocolate Brown, with purple wash on the latter and on some secondaries and other wing feathers. Rump with a moderate-sized silvery white patch; some feathers (especially posteriorly) often tipped, barred, or washed with blue (Turquoise to Azure) or purplish. Underparts Raw Sienna to Tawny (darkest anteriorly), with throat often buff. Within the series there exists some variability in color, with the palest birds being from Sikkim.

Immature—Color similar to adult, but darker brown above and with little or no purplish; below, barred faintly to moderately with dusky on the feather tips of the side of the throat, breast, and posterior abdomen. Rump patch tends to be smaller and with more blue or purplish. Measurements: one specimen = wing length 110.5, wingtip 28.0, culmen length 39.2, mandible width 15.2.

Specimens examined: Nepal 3; Sikkim 3; India—Assam 5, Darjeeling 2, Bengal 1, no other locality 1; Burma 3; Thailand 3; Malaya 2; Singapore 1; Sumatra 6.

Range: The breeding distribution includes Nepal, Sikkim, northern Burma (Myitkyina), and northeastern India in Darjeeling, Assam, and (according to Ali and Ripley [1970:88]) Nagaland, Manipur, and West Bengal, plus Bhutan and East Pakistan (= Bangladesh). In addition, Sharpe (1892:220) lists summer specimens from southern Burma (Amherst), but we have not seen them to be able to assign them to a race. Migrant *coromanda* occur south to Sumatra, including southern Burma,

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* For measurements of adults, see Tables 2 and 3.

† Throughout the text, capitalized colors are from Ridgway, 1886.

Thailand, Malaya, and Singapore; they have also been reported on Berhala Island (east of Sumatra) by Mees (1970), once in Borneo (Smythies, 1960:304), and at Amoy, China (Oberholser, 1915). We have examined the Amoy specimen (USNM) and find it to be *H. c. major*; consequently, this would seem to remove the basis for statements reporting the occurrence of *coromanda* in southeastern China (e.g., Peters, 1945: 194).

Reports of *H. coromanda* from southern Vietnam (Wildash, 1968:130) could possibly refer to the nominate form, although we know of no specimen records east of Thailand. It is also possible that the species breeds more widely in southeastern Asia than now believed, although definite evidence of such is unknown to us. Several specimens from the Malay Peninsula—albeit taken outside the expected spring-summer breeding season—show intergradation of a type that one would expect if the larger, paler *coromanda* were intergrading through a series of breeding populations with the smaller, darker *minor* to the south. The situation will be discussed under the latter race.

Although the inference of Ali and Ripley (1970:88) is that *H. c. coromanda* is resident in the breeding area, we have seen specimens taken there only in the period from 22 April to 10 July. Outside the breeding area, we have seen specimens typical of this race taken between 22 October (Singapore) and 24 April (Burma and Thailand). The only winter specimen from India that we have seen was one (ANSP) taken at the delta of the Ganges, Bengal, on 12 February, while a November specimen was reported from Madras, in the far south (Whistler and Kinnear, 1935). We do not doubt that some birds winter in their breeding areas, but others, perhaps many, migrate southward for that period.

Halcyon coromanda major (Temminck and Schlegel, 1842)

Alcedo (*Halcyon*) *coromanda major* Temminck and Schlegel, *in* Siebold's Fauna Japonica, Aves, 1848:75, pl. 39. Japan. Holotype (not examined) in Rijksmuseum van Natuurlijke Historie, Leiden.

Entomothera coromanda ochrothorectis Oberholser, Proc. U.S. Nat. Mus., 48:652, 1915. Palanoc, Masbate Island, Philippine Islands. Holotype (No. 233,081—examined) in U.S. National Museum.

Description: ADULT—Typically paler than *coromanda*, especially on the underparts, with the longest wing and wingtip of the species and a moderately long tail; the rump patch is reduced to a stripe, often broken, with the color Pale Blue to darker, more greenish blue. Dorsally largely rufous, with the wash palest Lilac to Rose Purple—much paler than *coromanda*. Breast Tawny to Ochraceous, becoming paler, even buff, on the throat and posteriorly. In two July specimens from Korea (FMNH, KU) and an undated one from Japan (FMNH), the breast is darker (Tawny Ochraceous) and the throat and abdomen are slightly darker than typical *major.* Dorsally these birds are also slightly darker. We regard these as variants of *major,* particularly as Korean breeding birds consist of both paler and darker types.

IMMATURE—Similar to adult but with sides of throat, breast, and upper abdomen squamate with dusky and usually lacking purplish above; underparts variable, ranging from buff to the rufous of adults; rump deeper blue. Measurements: two specimens = wing length 115.0–117.5, wingtip 31.0–32.5, P3>2 by 2.0–2.5, tail 63.5–65.5, culmen length 39.5, mandible width 15.5–17.1.

Specimens examined: Korea 6; Japan—Hokkaido 1, Honshu 14, no other locality 1; Ryukyu Islands—Okinawa 3, Iheya 1, Yayeyama 1; China 2; Taiwan 11; Philippines—Luzon 41, Masbate 1, Mindoro 1, Sibuyan 2, Cebu 1, Guimaras 1, Calayan 1, Mindanao 2; Celebes 1; Lembeh Id. 3.

Range: The breeding distribution includes at least southern Korea and central and northern Japan (Hokkaido, Honshu); breeding in central Manchuria has also been reported by some authors, including La Touche (1931:81–32), who also reported migrants on Shaweishan Island at the mouth of the Yangtze River in June. Although we know of no evidence of *H. coromanda* breeding in China, this is a likely possibility. The only definite Manchurian record that we know of is a 20 June specimen listed in the British Museum (Sharpe, 1892:220). Vaurie (1965:666) also reports occurrences of *H. c. major* elsewhere in Japan (Kyushu, Shikoku, Sado, Tsushima) and on Quelpart (= Cheju Do) Island, but the status of these birds is not known. Suggestions that the species breeds on Taiwan and in the main Philippine Islands (race "*ochrothorectis*") are of doubtful validity, as will be discussed later. Migrants of *major* occur southward to the Celebes, including on nearby Lembeh Island, in the main Philippine Archipelago (but not so far as known on Palawan or the Sulu Archipelago), on Taiwan, in the Ryukyus, and in eastern China. Vaurie (1965:666) also reports a straggler on Sakhalin Island.

Although Austin and Kuroda (1953:482) regarded the species as breeding southward only to central Honshu in Japan, we have seen three August-September specimens from the Kyoto area that suggest the presence of a breeding population there. These specimens are darker and have larger, whiter rump patches than any more northern Japanese birds that we have seen; in fact, they can be regarded as intergrades between *major* and the Ryukyu race, *bangsi.* While we do not suggest that this intergradation results from birds breeding throughout southern Japan, this is certainly a possibility. At any rate, the distinctive intergrades suggest that breeding occurs farther south than central Honshu.

Statements that *H. coromanda* breeds on Taiwan and in the main Philippine Archipelago were not substantiated by our study, and it appears that all of the birds occurring in these two areas are migrants of *major* (or of the Ryukyu race, *bangsi*). We have seen specimens of *major* taken in Taiwan from 21 April to 24 May, and in the Philippines from 30 September to 17 May. This fits well with the known occurrence of *major* on its breeding grounds, i.e., 16 May to October in Japan (Austin and Kuroda, 1953:482) and May to September in Korea (Gore and Won, 1971:285).

As previously indicated, Oberholser (1915) described the race *ochrothorectis* from the Philippines—on the erroneous assumption that *H. coromanda* was resident in the main part of the archipelago. Although his type series was actually a mixture of *major* and *bangsi*, the type itself is the darker variant of *major*—which we described earlier in this paper. This variant is more common in Korea (2 of 6 specimens) than in Japan (1 of 14 specimens from Hokkaido and northern Honshu), which may indicate the existence of an east-west cline of increasingly dark coloration in *major*. If there is a breeding population in China (including Manchuria), perhaps it is predominately dark. Whether it would be separable as a distinct race would have to be determined, but the name *ochrothorectis* would probably be applicable. It is also conceivable that the darker form would breed in Taiwan, where it predominates over paler specimens of *major* (7 of 10 specimens); however, as already stated, no evidence of breeding seems to have been reported from the island. At any rate, "*ochrothorectis*" is neither a resident nor a breeder in the Philippines, and at present we synonymize it as the dark variant of *major*. Of the 50 specimens of *major* that we examined from the Philippines, about one third are the darker type.

Halcyon coromanda bangsi (Oberholser, 1915)

Entomothera coromanda bangsi Oberholser, Proc. U.S. Nat. Mus., 48:654, 1915. Ishigaki, Yayeyama Group, Rio Kiu [= Ryukyu] Islands, Japan. Holotype (No. 49,990—examined) in U.S. National Museum.

Description: ADULT—Much darker than either *coromanda* or *major*, with more extensive purplish above than in those races and, unlike them, often with that color on the breast; slightly shorter in wing but longer in tail than *major* and much longer in wing and tail than *coromanda*. The rump patch is large and mainly white, versus small (and broken) and largely bluish in *major* and smaller and with more blue in *coromanda*. Dorsally, light to dark Rose Purple, this overlaying dark rufous-brown; the purplish extensive, extending well onto the crown and the sides of the face. The underparts are dark Tawny Ochraceous or Raw Sienna, with a tendency toward paler posterior underparts in some birds and especially anteriorly in most, with the chin buff; in many birds there is a pale Rose Purple wash over the breast.

Immature—Similar to adult, but generally lacking purplish, and with the sides of throat, breast, and upper abdomen barred with dusky; rump patch resembles that of adults, but somewhat more bluish (less white). Separated from *major* and *coromanda* by darker coloration and larger, whiter rump patch; also larger than *coromanda*. Measurements: six specimens = wing length 119.5±2.0, 117.0–122.0; wingtip 30.1±1.7, 28.5–33.0; P3>2 by 3.2±4.0, 1.5–4.0; tail 68.4±4.2, 63.0–74.0; culmen length 42.9±2.2, 41.2–45.8; mandible width 16.4±0.3, 16.0–16.7.

Specimens examined: Ryukyu Islands—Amami O 4, Okino Erabu 1, Okinawa 7, Kerama 1, Yayeyama 1, Ishigaki 9, Iriomote 5, Yanakuni 1; Philippine Islands—Luzon 15, Calayan 1, Siquijor 6, Mindano 1; Talaud Islands—Salebabu 1.

Range: The breeding distribution is along the length of the Ryukyu Islands, where we have specimen records from eight of the islands; also reported on Tokuno, Miyako, and Yonaguni Islands (Vaurie, 1965:667). Migrants occur southward to the Philippines (not recorded on Palawan or in the Sulu Archipelago) and nearby Talaud Island. Vaurie (op. cit.) also reports an April specimen from Taiwan, but we have seen none from there and suspect that it was "*ochrothorectis*"—as we have seen the specimens that he examined. We have specimen records from the Ryukyus from 5 April to 13 September, with one specimen (USNM) from Yayeyama dated 2 February. From the worn state of the plumage of the latter, we suspect that the specimen is misdated—probably having been taken in the summer. In the Philippines, *bangsi* specimens have been taken between 26 September and 20 April, and the one (AMNH) from the Talaud Islands was collected on an unspecified date in May.

Halcyon coromanda minor **(Temminck and Schlegel)**

Alcedo (*Halcyon*) *coromanda minor* Temminck and Schlegel, *in* Siebold's Fauna Japonica, Aves, 1842:76. Borneo and Sumatra, restricted to Pontianak, Borneo, by Oberholser, 1915:649. Lectotype (not examined) in Rijksmuseum van Natuurlijke Historie, Leiden.

Entomothera coromanda neophora Oberholser, Proc. U.S. Nat. Mus., 48:646, 1915. Tapanuli Bay, northwestern Sumatra. Holotype (No. 179,191—examined) in U.S. National Museum.

Entomothera coromanda pagana Oberholser, Proc. U.S. Nat. Mus., 48:648, 1915. North Pagi [= Pagai] Island, western Sumatra. Holotype (No. 179,762—examined) in U.S. National Museum.

Description: Adult—Borneo-area birds are much darker than *coromanda* and *major* and are somewhat darker than *bangsi*; from all of these, *minor* differs in being much shorter in wing and, from *major* and *bangsi*, tail (slightly shorter than *coromanda*). Above, Borneo-area *minor* are dark brown, near Russet, heavily washed with Wine Purple to Phlox; the purples are extensive, including not only the back but also the forehead, sides of the head, and much of the wings. Below, Ochraceous to light Tawny, with a distinct Rose Purple to light Magenta breast band in most specimens. The rump patch is large and white.

Singapore *minor* (2 specimens) are quite similar to those from the Borneo area in color and size, but two of three presumed breeding birds from Sumatra ("*neophora*") are paler; also, the three average slightly larger in wing measurements. As there is overlap in these features between Sumatra and Borneo birds, we follow Peters (1945:195) and include them in *minor*. The seven adult specimens from the Mentawei Islands ("*pagana*"), off western Sumatra, differ from Borneo-area birds in averaging somewhat paler (somewhat darker than Sumatra birds); they also average longer in wing and tail than either Borneo or Sumatra populations. Again there is overlap in the characters, and we follow Peters (op. cit.) in including the Mentawei birds in *minor*. Several specimens from the Malay Peninsula and vicinity we regard either as atypical *minor* or as intergrades between that race and *coromanda*. In particular, two 28 March specimens (USNM) from southern Thailand (Nakhon Si Thammarat) are interesting, because in color and size they are quite similar to Sumatra *minor*—in which race we include them. Two other specimens are the size of *coromanda* but somewhat darker: one taken on 25 May at Koh Kut, extreme southeast of Thailand (USNM), and one without date from Malacca, Malaya (USNM). These two specimens we regard as *coromanda* toward *minor*.

To summarize, *minor* (sensu lato) is darker than *coromanda* and *major* and similar to or darker than *bangsi*; from *major* and *bangsi*, all *minor* populations differ in being much shorter in wing and tail length. From *coromanda*, *minor* differs by being not only darker, but also generally shorter in wing and in wingtip.

IMMATURE—Darker and browner (sootier) than the adult, lacking purple and having dusky squamation on the sides of the throat, auriculars, breast, and upper abdomen. Much darker than immatures of *coromanda* and *major*, and somewhat darker than *bangsi*; shorter in wing than those races and in tail than *major* and *bangsi*. Measurements: one specimen from Sumatra = wing length 101.5; wingtip 22.0; P3>2 by 4.5; tail 57.5; culmen length 46.5; mandible width 15.4; one specimen from Mentawei Ids. = wing length 101.5; wingtip 19.0; P3>2 by 3.5; tail not measurable; culmen length 44.8; mandible width 16.2.

Specimens examined: Borneo 11; Labuan Island 9; Singapore 2; Mentawei Islands—Batu 1, Siberut [= North Pora] 1, Pagai Utara 4, Pagai Selatan 2; Thailand 2.

Range: Presumably resident; found in Borneo and Singapore and, in atypical form, in Sumatra, in the Mentawei Islands, and in the Malay Peninsula, north at least to the Isthmus of Kra; also reported in western

Java by Mees (1970) and on Billiton (= Belitung) Island by Peters (1945:195). Records cited by Peters from Palawan and the Sulu Archipelago (Tawi Tawi Islands) refer to other races—discussed later.

As mentioned previously, the small, dark birds typical of the Borneo area and Singapore give way to slightly larger and paler populations in Sumatra (and the Malay Peninsula). This variational distribution has the appearance of a cline, grading from Borneo *minor* to the larger, paler breeding *coromanda* of the Indian region. As already stated, we have no direct evidence that a breeding continuum of populations actually exists between the two regions. In fact, at present the data point to a hiatus in most of southern Burma and Thailand, and even the assumption of breeding in the Malay Peninsula is tenuous—as we have no definite nesting records from there. On the other hand, the existence of intergrade specimens (i.e., *coromanda* × *minor*), which do not match those of any known breeding population, suggests that there may well be breeding areas in Indochina and vicinity. In addition, summer specimens have been collected in southern Burma (Amherst), in June–July, and in Malaya (Johore), in June (Sharpe, 1892:220).

Halcyon coromanda mizorhina (Oberholser, 1915)

Entomothera coromanda mizorhina Oberholser, Proc. U.S. Nat. Mus., 48:645, 1915. North Andaman Island. Holotype (No. 44,113—examined) in Royal Ontario Museum.

Description: Adult—The holotype, the only adult seen by us, resembles *coromanda* in size but is darker; *major* and *bangsi* are larger than *mizorhina*, with *major* much paler and *bangsi* somewhat so. *Mizorhina* is larger than *minor*, but varies from paler to somewhat darker than that form, depending on the population compared. Specifically, *mizorhina* is paler than Borneo-Singapore *minor*, with the purple coloration less lilac and the white rump patch tipped with pale blue. *Mizorhina* is somewhat darker than Sumatra *minor* ("*neophora*"), but is similar in color to *minor* from the Mentawei Islands ("*pagana*"). In fact, the latter might be included in *mizorhina* except for the fact that the two populations differ significantly in measurements. For example, the wings of seven Mentawei Island *minor* measure 100.5 to 108.0, compared to 115.0 in the *mizorhina* measured by us and 112.0 to 122.0 in a series measured by Baker (1927:274).

Immature—The one specimen seen is similar in color to the adult but lacks purple and has dusky squamation on the sides of the throat, breast, and abdomen. Paler than typical *minor* and darker than *coromanda*; smaller than *major* and *bangsi*, as well as darker. Measurements: one specimen = wing length 112.0, wingtip 24.0, P3>2 by 3.0, tail 68.0, culmen length 52.5, mandible 16.6.

Specimens examined: North Andaman Island 1; South Andaman Island 1.
Range: Resident on the Andaman Islands so far as known; according to Oberholser (1915) and Peters (1945) this is probably the race on the Nicobars (we have seen no Nicobar specimen of *H. coromanda,* but Sharpe [1892:220] lists one from there in the British Museum).

This race can be considered as an intergrade between *coromanda* and *minor,* being the size of the former while rather dark in color. Actually, in the one adult that we have seen, *mizorhina* is quite similar in color to Mentawei Island *minor* ("*pagana*"), but the size is significantly larger.

Halcyon coromanda linae ssp. nov.

Holotype: DMNH 4649, adult ♂, Iwahig (west of Puerto Princesa), Palawan, Philippine Islands; collected in May 1970 by an unspecified collector.

Description: Adult—A small, dark race suggesting *minor* from the Borneo area, of which it has previously been considered a part. Differs from that race in its consistently darker coloration, especially of the more plum-colored dorsum and the rufous of the underparts; size essentially the same. All other previously mentioned races are distinctly paler and have longer wings, wingtips, and tails. Upperparts dark Russet, extensively overlaid with dark Phlox to Wine Purple, this extending over the forehead, sides of head, and wing surface; below Tawny, generally with a dark Rose Purple to Magenta breast band. Rump patch large and silvery white, often with some bluish tipping.

Immature—None seen, but probably somewhat darker than minor.
Etymology: Named for Lina Florendo Rabor, wife and constant field companion of Dioscoro S. Rabor.
Specimens examined: Palawan 15.
Range: Confined to Palawan, so far as known; we have seen specimens from Panacan, Taguso, Aborlan, and Tarabanan, as well as the type locality.

Halcyon coromanda claudiae ssp. nov.

Holotype: DMNH 27,729, adult ♀, Bulubuk, Sanga Sanga Island, Tawi Tawi Group, Sulu Archipelago, Philippine Islands; collected 20 September 1972 by D. S. Rabor and E. Macatiguib.

Description: Adult—Dorsally the darkest race of the species, recalling *linae* of Palawan but dorsum darker, more bluish (less plum) purple; wing and tail average longer than in that race, as does culmen. Darker than all *minor,* with longer wing, tail, and culmen, except for some overlap with Mentawei Island birds ("*pagana*"). Darker than other races, with shorter wing and tail (except than *coromanda*) and longer culmen (except than *mizorhina).* Upperparts Hazel to Burnt Sienna, extensively overlaid with Auricula Purple, this extending over the forehead, sides of head, and wings. Underparts similar to those of *linae,* but slightly paler Tawny; breast band prominent and the same color as the upperparts, but slightly paler and not quite as dark as that of *linae.* Rump white with some Nile Blue tipping, as in *linae* and *minor.*

IMMATURE—Similar to *minor,* but darker, especially on breast and auriculars. In *claudiae* the latter area is chestnut-brown with a little darker barring; in *minor* this area is buff and pale rufous, barred with dusky. In *claudiae* the brown of the upperparts is darkest on the crown, with the back paler and less sooty. The rumps in both are blue. Other races are paler and larger than *claudiae,* with the pattern of the auriculars like *minor.* Measurements: two specimens = wing length 101.5–102.0, wingtip 17.5–18.0, P3>2 by 4.5–5.0, tail 58.0–58.5, culmen length 42.5–47.3, mandible width 16.6–16.8.

Etymology: Named for Claudia Leigh Hubbard, wife of John P. Hubbard and an avid devotee of kingfishers.

Specimens examined: Tawi Tawi Island—Sanga Sanga 2, Tawi Tawi 4.

Range: Confined to Tawi Tawi Islands, Sulu Archipelago, so far as known.

***Halcyon coromanda rufa* Wallace, 1862**

> *Halcyon rufa* Wallace, Proc. Zool. Soc. London, 1862:338. Sula Islands and Celebes, restricted to Makassar, Celebes, by Sharpe, 1870 (*contra* Peters, 1945:195). Lectotype (not examined) in British Museum (Natural History).

Description: ADULT—This race recalls *minor* of the Borneo area, but is paler above and on the breast and has the large rump patch consistently blue (thus differing from all races); also the wing, wingtip, and tail are significantly longer, and the bill is somewhat larger than in *minor. Rufa* differs from *coromanda* and *major* in being darker, from *major* and *bangsi* in its smaller wing and wingtip (also tail compared to *bangsi*), and from *mizorhina* by its blue rump and smaller bill. *Claudiae* and *linae* are both much darker than *rufa,* with *linae* also having smaller measurements. Upperparts Cinnamon Rufous to light Chestnut overlaid with Rose to Wine Purple—less extensive than in *minor, linae,* and *claudiae.* Underparts rufous, resembling those of *minor,* but slightly darker; breast band similar to purple of back, paler and less extensive than in *minor.* Rump patch large and Nile to Turquoise Blue. Birds from Siau Island, north of Celebes, are slightly paler above than typical *rufa,* but otherwise they are similar in plumage and measurements; we include them in *rufa.*

Immature—Similar to the adult but plumage darker above, mainly lacking purple coloration; throat, breast, and anterior abdomen barred dusky. Rump deeper blue. Specimen not measured because it was not full grown.

Specimens examined: Celebes 9; Butung Island 1; Sangihe Islands—Siau Island 3.

Range: So far as known, confined to Celebes and vicinity, including Siau Island in the Sangihe Islands and Butung Island (southeast of Celebes). Also reported by Oberholser (1915) from Talaut (= Talaud), Lembeh, Peling (= Peleng), Togian, and Talissi (= Talisei) Islands; however, some of these records require reexamination. For example, the only specimen that we have seen from the Talaud Islands is *H. c. bangsi;* those from Lembeh are *H. c. major,* while those from Peleng are *H. c. pelingensis.* Peters (1945:195) included Oberholser's records under *pelingensis,* on the assumption that the name *rufa* was properly applied to the Sula Island race and that birds from Peleng and the Celebes were another race (see *sulana* for clarification).

Halcyon coromanda pelingensis Neumann, 1939

Halcyon coromanda pelingensis Neumann, Bull. Brit. Ornith. Club, 59:117, 1939. Peling (Peleng) Island (east of the Celebes). Holotype (not examined) said to be in the Museum of Comparative Zoology.

Description: Adult—In describing this race, Neumann (1939) stated that it differed from *rufa* of the Celebes only in having the wing and culmen much shorter. While Peleng birds average smaller than *rufa* in these measurements (as well as in tail length), considerable overlap exists and separation is not possible on this basis. Neumann's measurements for *rufa* are much larger than ours (those for *pelingensis* are similar), e.g., wings of 120–126 mm versus ours of 110.0–116.0. Although he was aware of migrants from farther north occurring in the Celebes, it would appear that he failed to exclude them from his sample (or possibly he misread or miscopied his measurements). Actually, we find *pelingensis* to differ from *rufa* on a consistent basis only in having the rump white rather than blue; its smaller size and slightly paler color are only average characters. The characters separating *pelingensis* from previously treated races are the same as those of *rufa,* except where rump color is concerned.

Immature—None seen but probably similar to that of *rufa.*

Specimens examined: Peleng Island 4.

Range: Peleng Island, east of Celebes; other island records of this race listed by Peters (1945:195) actually refer to *rufa.*

Halcyon coromanda sulana (Mees, 1970)

Halcyon coromanda sulana Mees, Zool. Mededelingen, 40:300, 1970. Soela-Bessi [= Besi Island, Sula Islands, east of Celebes]. Holotype (not examined) in Rijksmuseum van Natuurlijke Historie, Leiden.

Description: ADULT—A pale race, with large measurements; in tail and mandible width it is the largest race, next largest in culmen length, third in wing length, and with a moderate wingtip length. In its pallor, *sulana* recalls *coromanda* and *major*, but those races are somewhat darker and less purplish above and somewhat paler below; lack purplish on the breast; have smaller, less whitish rump patches; and have primary 3 rather than 4 the longest. In tail length alone *sulana* can be usually distinguished from all other races. *Bangsi* is notably darker above, but otherwise generally similar to *sulana*; other dark races also resemble *sulana*, differing in color in being from somewhat to considerably darker and in *rufa* in having the rump blue. Above, mainly Rose Purple, rump patch large and mainly white (some blue tipping); below, pale Tawny, with a Rose Purple wash on the breast.

IMMATURE—None seen.

Specimens examined: Sula Islands—Mangole Id. 4.

Range: So far as known, confined to the Sula Islands, east of Celebes, on Mangole and, according to Mees (1970), Besi Islands.

As indicated under *H. c. rufa*, Peters' (1945:195) treatment of Celebes-area breeding birds differs from that of Oberholser (1915) and various other authors. *Rufa* is the oldest name applied to the resident birds of that area, having been proposed for specimens from the Sula Islands and Celebes by Wallace (1862). Sharpe (1870) listed the type specimen of *rufa* as an adult ♂ collected at Makassar, Celebes, by Wallace in 1856. Neumann (1939) then described *pelingensis* from Peleng Island, located between the Celebes and the Sula Islands. Later, Peters (op. cit.) cited Neumann "*in litt.*" as having informed him that the type of *rufa* ". . . in the British Museum was collected by Allen either on Mangole or Besi" in the Sula Islands. Peters, overlooking the fact that no such specimen was listed from these islands by Sharpe (1892) as being in the British Museum collection, then restricted the name *rufa* to Sula Island birds, and, on the assumption that Peleng and Celebes birds were the same, called the rest *pelingensis*. The shift by Peters of the type locality of *rufa* from the Celebes to the Sula Islands is clearly in error and we accept Sharpe's original listing of Makassar. In this we agree with Mees (1970), whose discovery that Sula Island birds were distinct required that yet another name be proposed, i.e., *sulana*. In summary, the name *rufa* should be applied to birds from the Celebes and vicinity, with *pelingensis* restricted to the Peleng Island population and *sulana* to that of the Sula Islands.

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KEY TO FORMS

In this key only adults are included and sexes are lumped.

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1. Coloration pale, rump patch large and white, tail>74 mm (Mees, 1970) .... *sulana* (Sula Ids.)

1. Coloration and rump patch variable, tail<76.5 mm 2

2. Wing>115.0, wingtip>27.5, primary 3 usually longest 3

2. Wing<118.0, wingtip <31.0, primary 3 or 4 longest 4

3. Coloration pale, rump patch broken and bluish, tail<71.0 .... *major* (Japan, Korea; migratory)

3. Coloration dark, rump patch large and white, tail>68.5 .... *bangsi* (Ryukyus; migratory)

4. Coloration dark, rump patch large and blue, tail>65.5 .... *rufa* (Celebes region)

4. Coloration variable, rump patch otherwise, tail<67.5 5

5. Coloration rather dark, culmen length>51.0 .... *mizorhina* (Andaman Ids.)

5. Coloration variable, culmen length<51.0 6

6. Coloration pale, rump patch smaller and often with more bluish, primary 3 longest .... *coromanda* (Indian region; migratory)

6. Coloration variable, rump patch larger and largely white, primary 4 usually longest 7

7. Coloration rather dark, wing>108.5, tail>64.5 .... *pelingensis* (Peleng Id.)

7. Coloration variable, wing<109.5, tail<65.5 8

8. Coloration very dark, wing>105.0, tail>63.5, culmen length >47.8 .... *claudiae* (Tawi Tawi Ids.)

8. Coloration variable; wing, tail, and culmen lengths shorter (if not, coloration paler) 9

9. Coloration very dark, dorsum more plum colored .... *linae* (Palawan Id.)

9. Coloration variable but paler 10

10. Coloration darker, wing averages shorter (94.5–103.0) .... *minor* (Borneo, Singapore)

10. Coloration paler, wing variable 11

11. Coloration pale, wing averages shorter (100–103) .... "*neophora*" [= *minor*] (Sumatra, Malay Pen.?)

11. Coloration paler, wing averages longer (100.5–108) .... "*pagana*" [= *minor*] (Mentawei Ids.)

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NOTES ON NORTHERN MEXICAN BIRDS

AN EXPEDITION REPORT

*John P. Hubbard**
and
*Richard S. Crossin***

INTRODUCTION

This report is based primarily on data obtained during a two-part expedition to northern Mexico, led by the junior author for the Delaware Museum of Natural History. The first part was in the period 12 October–30 December 1971, and the second from 24 March–28 May 1972. The emphasis was on the northern Plateau of Mexico and the adjacent mountains, in the states of Chihuahua, Durango, Coahuila, Nuevo León, and Sinaloa. One brief foray also was made into the Pacific coastal plain of Sinaloa. The reason for concentrating on the northern Plateau and adjacent mountains, and on the autumn-spring period, is that this region is poorly known, particularly outside the breeding season. As the result of the expedition a number of species were added to the state lists of the region, data were obtained on migrant and winter species, fresh-plumaged material for studies of geographic variation was obtained, and some interesting spring breeding records were secured. In addition, we take this occasion to describe a new race of *Aimophila ruficeps* from southeastern Sinaloa.

The data for this report are primarily from specimens, with some sight observations. Also included are a few pertinent records obtained in Sinaloa by Crossin in fieldwork carried out from 1964 to the present.

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rales of Durango. We also thank members of the expedition teams who made the venture a success, notably Ronald Galley, Abraham Ramírez, Sr., and Abraham Ramírez, Jr. Finally, we thank Charles Ely, David M. Niles, and Allan R. Phillips for reading drafts of this paper and providing constructive comments, and Ned K. Johnson, Roxie Laybourne, John Weske, and others for helping in identification or use of specimens.

Collections are cited as follows: AMNH—American Museum of Natural History; BMNH—British Museum (Natural History); CAS—California Academy of Science; DMNH—Delaware Museum of Natural History; MC—Moore Collection, Occidental College; NF—Neotropical Ornithological Foundation; UMMZ—University of Michigan Museum of Zoology; and USNM—United States National Museum of Natural History.

LOCALITIES

In order to conserve space in citing localities, the following detailed listing is given, including brief ecological descriptions and dates of visitation. The localities given in small capital letters are the short-form designations used in the main text.

CHIHUAHUA

Hidalgo del PARRAL, 4 miles south-southeast on Highway 45; 6800 feet. Dry oak-grassland to grassland, with denser vegetation in the form of small oaks (*Quercus*), mesquite (*Prosopis*), and catclaw (*Acacia*) along the dry washes. Tiny man-made lake present, formed by damming up a streamlet—water appearing above ground only in spots. 30 October–1 November 1971.

MT. MOHINORA, 33 road miles southwest of El Vergel; 10,200 feet. Primarily dry pine (*Pinus*) forest with few scattered small (to 30 feet) oaks and occasional firs (*Abies*), the latter primarily restricted to the stream beds. The entire area logged of pine some years back, but an abundance of pine seedlings and trees of up to 1½ feet diameter is now present. Terrain primarily precipitous rocky canyons. 17–21 October 1971.

REPRESO EL TINTERO, 32 road miles south of Buenaventura; 5500 feet. Man-made lake approximately 6–7 miles long by about 1 mile wide; area completely denuded by grazing; trees nonexistent near the lake. Distant hills primarily covered by oak-grassland. 22–24 December 1971.

RIO SANTA BARBARA, 10 miles south of Hidalgo del Parral on Highway 45; 6500 feet. Large river bordered with big cottonwoods (*Populus fremontii*), pecans (*Carya*), and willows (*Salix*); mesquite and saltbrush (*Atriplex*) abundant in side washes. Entire area used for grazing or agriculture. 28 April–2 May 1972.

Rio Valles, 2 miles north of Buenaventura; 5200 feet. Small, clear stream bordered by huge cottonwoods, mesquite, and saltbrush. Some agriculture, but primarily cattle grazing. Area very heavily grazed. 25–30 December 1971.

Rio Vallesa. 56 road miles southwest of Hidalgo del Parral; 6750 feet. Oak-grassland, with abundant small, shrubby willow, catclaw, wild grape (*Vitis*), and prickly pear cactus (*Opuntia*) along a small stream. Primarily pasturelands with agriculture along the floodplain. 22–29 October 1971.

COAHUILA

Palo Blanco, 14 miles north of Saltillo; 4400 feet. Small clear stream with saltbrush, willow, and few large ash trees (*Fraxinus*) along immediate border. Surrounding country extremely arid, with an array of low, closely spaced cacti, agave (*Agave*), and catclaw; somewhat more substantial vegetation along the dry washes in the form of mesquite and large treelike yuccas (*Yucca*). Entire area heavily grazed by large goat herds. 12–18 December 1971 and 10–12 May 1972.

Puente El Chorro (No. 2), 15 miles southeast of Saltillo on Highway 57; 6000 feet. Small clear stream bordered by luxurious growth of saltbrush and various marsh grasses. Surrounding hills quite arid with scattered agave, yucca, and low shrubs. A limited amount of cattle grazing. 13–14 May 1972.

DURANGO

El Salto 1, 5 miles west; 7500-8200 feet. Clear stream meandering through cleared, heavily grazed meadows. Fairly dry, second growth pine forest with trees up to 35 feet in height; limited cutting of the few larger trees for lumber still in progress. Except for occasional patches of small willows, the stream is devoid of vegetation because of cattle grazing. 14 October 1971, 20–25 November 1971, and 24–28 March 1972.

El Salto 2, 13 miles west; 7500-8200 feet. Small clear stream running through a fairly dry, second growth pine forest with some trees up to 50 feet and more in height; as at El Salto 1, a limited amount of cutting of the larger trees is still in progress. A few small oaks and large old junipers (*Juniperus*) in sheltered canyon heads. Entire area heavily grazed and, except for a flowering composite (Compositae), the streamside is devoid of vegetation. Introduced trout (up to 12 inches) in stream, mostly restricted to the few pools. 21–28 May 1972.

Laguna de Santiaguillo, 10 miles north-northeast of Guatinapé; 6600 feet. Large, fairly shallow lake about 8 miles by 3 miles. Large patches of cattails (*Typha*) and tules (*Scirpus*) present in various parts of the lake. Shoreline heavily grazed except for the north side, which is largely fenced into sections for farming. A narrow peninsula supporting numerous huge cottonwoods and willows extends about a quarter mile into the lake on the north side. A combination of habitats (including abundant marshy shoreline, weedy fields, grain farming), as well as the lake being unmolested by boats, made this area the birdiest spot visited on the north-central plateau—with by far the greatest number and variety of land, water, and marsh birds encountered. 13–18 November 1971 and 19–24 April 1972.

Presa San Francisco Zarco, 40 miles south of Torreón, Coah., and 8 miles west of Highway 40; 5000 feet. Bald-cypress (*Taxodium*) willow, and bamboo (Gramineae) thickets along a river. 18–20 May 1972.

Rio Mezquital, 45 miles south-southeast of Durango; 4500 feet. River (minimum depth 3–4 feet) lined with large bald-cypress (up to 5 feet in diameter) and willows. Ridge above with abundant pinyon (*Pinus*), others with a few junipers and small oaks. Hillsides with desert shrub intermixed with cacti; tree tobacco (*Nicotiana*) in washes. 3–10 November 1971 and 30 March–4 April 1972.

Rio Nazas, 16 miles southwest of Torreón, Coah.; 3800 feet. River lined with cottonwoods, willows, and saltbrush in patches, giving way to farmland in the valley. Hillsides with creosote bush (*Larrea*), agave, and scrub. 8–11 December 1971 and 15–18 May 1972.

Tepehuanes, 2 miles southeast; 5900 feet. A small clear stream in hilly area in which are a few oaks and many junipers. 11–13 November 1971.

NUEVO LEON

La Esperanza, 15 miles east of San Antonio de las Alanzas, Coah.; 9000 feet. Dry canyon on south side of a mountain in pastureland. Pockets of short-leafed pines (pinyon?), 30–35 feet tall and scraggly, mixed with yuccas and agaves. Very dry habitat surrounded by farmland and other cleared areas. Yuccas widely blooming, while agaves —flower stalks about 15 feet tall—only sporadic, but attractive to birds. Dense scrub oak in a nearby canyon. 4–10 May 1972.

SINALOA

Concordia, 9 miles northeast; 1000 feet. River with a few large figs (*Ficus*) and other trees, with 20 foot high, partly cleared, and grazed thorn forest on hills. 14–17 April 1972.

Rancho Carrizo, 6 road miles west of Palmito; 6000 feet. Area of small oaks (up to 35 feet) and scattered pines; small spring present and farmland and other clearings are interspersed. Overgrown fields support dense blackberry (*Rubus*) thickets, which were bearing heavily in November. At that time also flowering were small plants with purple flowers (Labiatae?), epiphytes with tubular orange flower (Loranthaceae?), and madrone (*Arbutus*). Below is barranca that drops 500 and then 500–800 feet and contains lush growth. Whole area was wet in autumn. In spring it was drier, oaks and blackberries were in flower and growing new leaves, the madrone were in fruit, and orchids (*Taeallia*) were no longer in bloom. For a more complete description, see Crossin (1967). 12–14 October 1971, 26 November–6 December 1971; and 6–12 April 1972.

ANNOTATED LIST

In the following accounts, only the short-form localities (shown in small capitals in the preceding descriptions) are employed, and the year is omitted from dates for the 1971–1972 expedition data: unless otherwise specified, all October–December records are in 1971 and March–May records are in 1972. In large part we have based our comments on the "Check-list of the Birds of Mexico" (Friedmann *et al.*, 1950; Miller *et al.*, 1957), here shortened to "Mexican Check-list," as this is the most generally complete technical work on the birds of the Republic. In essence, this paper is meant to supplement that work, although where possible we have attempted to cite other relevant publications that have already supplemented it. In spite of its deficiencies and shortcomings, the Mexican Check-list is the most generally available and widely used work of its kind, particularly for such regions as the northern Plateau—on which so little has been published.

Measurements in the following text are metric, with the wing being the chord (unless otherwise specified). Various abbreviations are used, mostly of a standard nature. Examples include: t. = testes, ov. = ovary, s.n.o. = skull not ossified, etc. The order of species is largely that of the Mexican Check-list.

***Aechmophorus occidentalis* (Lawrence). Western Grebe**

The Mexican Check-list records this species on the northern Plateau only from Chihuahua, but Crossin observed dozens in Durango on Laguna de Santiaguillo on 13–18 November and at least 2 there on 19–24 April.

***Pelecanus erythrorhynchus* Gmelin. White Pelican**

The Mexican Check-list does not record this species from the northern Plateau, but Crossin saw several at Laguna de Santiaguillo on 13–18 November and 1 on 19–24 April.

***Phalacrocorax olivaceus* (Humboldt). Olivaceous Cormorant**

The Mexican Check-list does not record this species from Durango, but Crossin saw 7 or more on the Río Mezquital on 30 March to 4 April.

***Chen caerulescens* (Linnaeus). Snow Goose**

The Mexican Check-list does not record this species from Durango, but Crossin saw thousands on Laguna de Santiaguillo on 13–18 November, with many still there on 19–24 April. In November, flocks of up to several hundred birds were seen to leave the lake shore in late afternoon, moving to feed in nearby pastures and grain fields. By early morning the flocks had reassembled on the lake shore. Hundreds of geese were also seen just to the north, at Peña del Aguila, in late October and early November.

***Anser albifrons* (Scopoli). White-fronted Goose**

The Mexican Check-list does not record this species in Durango, but Crossin saw thousands at Laguna de Santiaguillo on 13–18 November; he also saw 40 at Represo El Tintero, Chihuahua, on 23–24 December.

***Anas diazi* Ridgway. Mexican Duck**

In view of the recent seeming decline in this species (Aldrich and Baer, 1970), these observations by Crossin may be of interest: Chihuahua, 75–100 at Represo El Tintero on 20–26 December and about 15 at Río Santa Barbara on 28 April–2 May; Durango, large numbers at Laguna de Santiaguillo on 13–18 November and 9 or more there on 19–24 April.

***Aix sponsa* (Linnaeus). Wood Duck**

DGO.: Río Mezquital—♀, 3 April

The Mexican Check-list records this species in Mexico only from Sinaloa and the Distrito Federal. The above specimen shows no sign of having been in captivity, e.g., the plumage is not unduly worn.

***Mergus serrator* Linnaeus. Red-breasted Merganser**

The Mexican Check-list records this species only from Baja California and Sonora, but Crossin saw 3–5 at Represo El Tintero, Chihuahua, on 23–24 December.

***Coragyps atratus* (Bechstein). Black Vulture**

In view of the recent seeming decline of this species (A. R. Phillips, pers. comm.), these records by Crossin may be of interest: Chihuahua, 40–50 at Represo El Tintero on 26–30 December and about 20 at Río Santa Barbara on 28 April–2 May (these are apparently the first records of this species from Chihuahua); Sinaloa, 40–50 near Concordia on 14–17 April; Durango, 4–5 at Río Mezquital on 30 March–4 April, about 60 at Presa San Francisco Zarco on 18–20 May, and 500 at Laguna de Santiaguillo on 13–18 November and 5–10 on 19–24 April. Over the same period, Turkey Vultures (*Cathartes aura* [Linnaeus]) were seen more widely but in generally smaller numbers. The maxima were 150–200 at Laguna de Santiaguillo on 13–18 November, with numbers elsewhere 20 or less per day. Winter records were obtained as far north as Chihuahua, i.e., 10–20 at Represo El Tintero on 23–24 December and 5–10 near Buenaventura on 26–30 December. The large numbers of both species of vultures at Laguna de Santiaguillo in November were presumably attracted by the dead and dying horses there, victims of a severe outbreak of encephalitis.

Accipiter cooperii (Bonaparte). **Cooper's Hawk**

DGO.: Río Mezquital–im. ♂, 6 November

The Mexican Check-list does not record this species from Durango; Fleming and Baker (1963:276) list sight records near Boquillas in July.

Buteo regalis **(G. R. Gray). Ferruginous Hawk**

The Mexican Check-list does not record this species from Chihuahua, but Crossin saw a light-phase adult near Babicora, about 60 km south of Buenaventura, on 21 December. The bird was perched on a telephone pole by the road, holding a ratlike rodent in its talons.

Buteo brachyurus **Vieillot. Short-tailed Hawk**

Crossin observed a pair (one light- and one dark-phase bird) at Rancho Carrizo, Sinaloa, on numerous occasions in 1964. The Mexican Check-list does not record the species from Sinaloa.

Pandion haliaetus **(Gmelin). Osprey**

The Mexican Check-list does not record this species from Durango, but Crossin saw 1 at Presa Francisco Zarco on 18–20 May. He was under the impression that a huge nest of sticks, about 50 feet up in a riparian *Taxodium*, belonged to the bird, but breeding in the interior of Mexico has not been confirmed.

Falco peregrinus **Tunstall. Peregrine**

In view of the drastic decline of this species, the following records are of interest: Durango, at least 1 at Laguna de Santiaguillo on 13–18 November; Chihuahua, an adult ♀ (presumed) at Represo El Tintero on 22–24 December; and a ♀ (presumed) at Río Valles on 25–30 December. Not recorded by the Mexican Check-list from Chihuahua and Durango.

Callipepla squamata **(Vigors). Scaled Quail**

COAH.: Palo Blanco–ad. ♂, ad. ♀, 2 juv. ♀ ♀, 11–12 May

The Mexican Check-list is somewhat unclear about the races occurring in southern Coahuila, but all of these birds are close to the nominate race (the May specimen shows some approach to *castanogastris* Brewster in belly color). Friedmann (1946:269–271), Amadon and Phillips (1947), and Urban (1959:459–460) also assign southern Coahuila birds to *C. s. squamata*.

Grus canadensis **(Linnaeus). Sandhill Crane**

Additional records from Durango are of 40 seen by Crossin at Laguna de Santiaguillo on 13–18 November.

Charadrius vociferus vociferus **Linnaeus. Killdeer**

COAH.: Palo Blanco—ad. ♂, ad. ♀, 2 juv. ♀♀, 11–12 May

The Mexican Check-list does not record this species as breeding in Coahuila, although Urban (1959:461) has reported a ♂ with enlarged testes taken in the extreme north.

Calidris minutilla **(Vieillot). Least Sandpiper**

DGO.: Laguna de Santiaguillo—series, 23–24 April

The Mexican Check-list does not record the species from Durango.

Recurvirostra americana **Gmelin. American Avocet**

The Mexican Check-list does not record this species from Durango, but Crossin saw about 20 at Laguna de Santiaguillo on 19–24 April.

Zenaida asiatica **Linnaeus. White-winged Dove**

CHIH.: Parral—♀, 1 October
DGO.: Río Mezquital—3 ♀♀, 2 ♂♂, 1–4 April; 2 ♂♂, 4–9 November
SIN.: Concordia—♀, 15 April

We have attempted to identify these specimens subspecifically based on Saunders' (1968) review. The Sinaloa specimen is darker and browner than four of the five spring birds from Durango, being about equally dark but browner (less grayish brown) than the fifth. Saunders separated Pacific Coast populations of most of Mexico as a new race, *Z. a. palustris*, and the above color characters ally the Sinaloa bird with that form. In wing (156.0 mm) and culmen (21.5 mm) lengths there is also agreement, but the tail (108.0 mm) is slightly short for *palustris*. Saunders reports *palustris* as being essentially confined to mangrove areas, while the present specimen (ov. 9 × 7 mm, ova to 3 mm, no fat) was taken in thorn forest at about 1000 ft. elevation. Nevertheless, as far as we can determine, it is closer to *palustris* than to any other form.

Saunders (1968) also described as a new race, *Z. a. monticola*, the population breeding over most of the Mexican Plateau. The Durango birds all agree with the description and measurements of *monticola*, except that the culmens of two ♀♀ (18.0 and 18.6 mm) are below the minimum of 19.2 mm listed in Saunders. These ♀♀ are part of the spring series from Río Mezquital and undoubtedly represent the local breeding form: all birds from there had enlarged gonads and one ♀ was taken at a nest. It remains to be seen whether *monticola* is truly separable from *mearnsi* (Ridgway), as the characters seem slight.

The Chihuahua specimen is somewhat discolored, but it is definitely dark. It may be *Z. a. asiatica,* but its wing (165.5 mm) and tail (113.0 mm) exceed the maxima listed by Saunders, i.e., 158.9 and 112.6 mm, respectively.

Rhynchopsitta pachyrhyncha **(Swainson). Thick-billed Parrot**

Crossin saw this species only twice during the expedition: a maximum of 5 at Mt. Mohinora, Chihuahua, on 19–20 October and 2 at Rancho Carrizo, Sinaloa, on 7 April. Also in Sinaloa, at the nearby Rancho Liebre, Crossin observed a large flock of these birds from 7–19 May 1964. Initially, about 100 birds came at dusk to a canyon there, where they went to roost in crevices in the cliffs. Each morning they departed, flying southward. By the end of the period over 200 birds were in the flock. The species is not recorded from Sinaloa in the Mexican Check-list.

The Thick-billed Parrot is considered an endangered species by the U.S. government, and its numbers appear to have declined in recent years. This may well be due to heavy lumbering in the Sierra Madre Occidental, as well as to widespread failures of pine cone crops. In the summers of 1957–1961, Fleming and Baker (1963:281) did not see the species in the mountains of Durango, and we have similar reports of absence or scarcity from other observers.

Piaya cayana mexicana (Swainson). **Squirrel Cuckoo**

SIN.: Rancho Carrizo—ad. ♂, 13 October; ad. ♀, 30 November

The Mexican Check-list does not record this species above 3500 ft. in Sinaloa, but these were taken at 6050 ft. in pine-oak woodland. In 11 years of fieldwork, Crossin has not previously encountered the species at this site.

Otus flammeolus **(Kaup). Flammulated Owl**

SIN.: Rancho Carrizo—3 ad. ♂♂, 3–4 December (46.0, 48.5, 59.5 g; medium to heavy fat); ad. ♀, 2 ♂♂, 7–11 April (48, 50, 51 g; fat none to light)

N.L.: La Esperanza—ad. ♀, 5 May

The Mexican Check-list does not list this species from either of these states: moreover, the Nuevo León record is of a breeding bird—the only other in Mexico is in Veracruz, according to the Check-list. The breeding specimen is an adult ♀, which weighed 87 g and had heavy fat deposits. It was taken from a nest in a yucca, at 10,000 ft. in pine-yucca forest; it had three heavily incubated eggs. This and all but one of the Sinaloa specimens are reddish, according to Marshall (1967), a characteristic of southern birds of the species. The exception is a gray ♂ taken at Rancho Carrizo on 4 December. It is similar to most U.S. birds and may be a northern migrant.

The Mexican Check-list treats *O. flammeolus* as a race of *O. scops* (Linnaeus), undoubtedly following Delacour (1941). Hubbard (1965) has pointed out that the two forms differ in voice and eye color, as well as in the traditionally appreciated features of size and plumage (see also Marshall 1966, 1967). Under the circumstances, and because owls less dissimilar than these occur as sympatric species, lumping *O. flammeolus* with *O. scops* seemed quite inappropriate.

***Otus asio suttoni* Moore. Screech Owl**

CHIH.: Río Valles—ad. ♂, 26 December
Río Santa Barbara—ad. ♀, ad. ♂, 30 and 28 April

The Mexican Check-list does not record this species from Chihuahua, although Marshall (1967) found it common there in several places.

***Otus trichopsis aspersus* (Brewster). Whiskered Owl**

SIN.: Rancho Carrizo—ad. ♂, 2 December

The Mexican Check-list does not record this species from Sinaloa, although Marshall (1967) reported specimens from there. On 23 May 1963, Crossin collected a pair of adults and the two eggs (NF) from their nest at Rancho Carrizo.

***Asio otus wilsonianus* (Lesson). Long-eared Owl**

N.L.: La Esperanza—ad. ♀, juv. ♀, 8 May

According to the Mexican Check-list, this species has not been found breeding in Mexico outside of northwestern Baja California. The adult listed above was one of a pair, while the juvenile was the only one found. It was in a hollow in a large yucca, in pine-yucca vegetation at about 9000 ft. The adult is rather dark and agrees with typical eastern North American birds. Western birds are often pale (as are some eastern birds) and have been separated as *A. o. tuftsi* Godfrey; that form is not recognized by the Mexican Check-list.

***Aegolius acadicus acadicus* (Gmelin). Saw-whet Owl**

DGO.: El Salto 2—ad. ♀, ad. ♂, 28 and 24 May (respective wts. 71 and 64 g, no fat, gonads small)

The Mexican Check-list does not record this species from Durango. From the late dates, these birds might have been expected to have remained in the area to breed. The ♂ is in tail molt, with the outer pair of rectrices about 10 percent grown, the next pair about 70 percent grown, and the inner ones in pin or missing.

Caprimulgus vociferus **Wilson. Whip-poor-will**

C. v. arizonae (Brewster)

SIN.: Rancho Carrizo—♂, 2 December (47.5 g, heavy fat)

This species is not recorded in winter in Sinaloa by the Mexican Check-list. As did Ridgway (1914:520), we find the separation of *arizonae* and *vociferus* on the basis of plumage characters to be tentative at best. Our specimen is browner above and has less heavily spotted scapulars than typical *vociferus,* thus agreeing more with *arizonae.* On the basis of size, especially the long rictal bristles, it is also nearer that race: wing 163.5, tail 118.0, bristles 45 mm. Craig (1971) has suggested another character to distinguish these races, i.e., the coloration of the rictal bristles: blackish in *vociferus* and blackish with brown at the base in *arizonae.* We find overlap in this character in specimens examined by us (DMNH, USNM), and the specimen listed above has blackish bristles. In view of the overlap in characters between the two races, we have considerable reservation about the California record of *C. v. vociferus* reported by Craig (1971); the bird was banded and released. Even with the direct comparison to specimens that was done, one cannot rule out the possibility that the bird was not a variant of *arizonae.* While it was short-winged, in the few specimens of breeding-season *arizonae* that we measured, some are smaller than those reported by Ridgway (1914) and nearly as small as the California bird.

C. v. oaxacae (Nelson)

SIN.: Rancho Carrizo—♂, 7 April (46 g, light fat, t. 4 × 3 mm)

The Mexican Check-list records *oaxacae* as breeding northward to southern Guanajuato and Coahuila, and it states that the race is only a "slightly larger and darker" than *arizonae* and "nothing but a variable series of intermediates between" that race and *chiapensis* (Nelson). We are unable to evaluate the characters of size (our bird is small; i.e., wing 155.5, tail 112.5 mm), but specimens (USNM) of *oaxacae* differ from *arizonae* in more than just being darker. More importantly, they are more coarsely barred below (less vermiculated) and have the light markings of the posterior underparts more spotlike than either *arizonae* or *vociferus.* Above, they tend also to be more coarsely marked and, in general, darker and more rufescent. We find our specimen similar to the type (USNM) of *oaxacae* but paler; however, we understand why Ridgway (1914:520-521) limited *oaxacae* to Oaxaca, as none of his specimens (USNM) from north of there are as dark as the type. However, birds from as far north as Nuevo León show the coarse barring and spotlike ventral marking of *oaxacae,* as indicated by the treatment in the Mexican Check-list. On this basis, the specimen from Rancho Carrizo can also be assigned to *oaxacae,* as it is certainly as representative of that race as specimens that we have seen from Nuevo León and Guerrero (USNM). Another specimen, taken in Durango at Río Mezquital (♂, 4 November, 51.5 g, heavy fat), is essentially intermediate between *arizonae* and *oaxacae,* although, as also true of the Sinaloa specimen, it is small (wing 156.5, tail 115.0).

Aeronautes saxatalis sclateri **Rogers. White-throated Swift**

CHIH.: Río Santa Barbara—ad. ♀, 30 April (ov. 5 × 3 mm)
COAH.: Palo Blanco—ad. ♂, 11 May (t. 4 × 9 mm)

This northern Rocky Mountain race is not recorded for Mexico by the Mexican Check-list, although obviously it is to be expected there as a migrant. Rogers (1939) gave wing lengths (arc) for *sclateri* as 142–155 mm ($\bar{x}$ 146.6) versus 128–145 mm ($\bar{x}$ 138.5) for the nominate race. Our specimens, which have the gonads small, measure 146.5 in the ♀ and 150 mm in the ♂. Ely (1962) listed a ♀ specimen from Coahuila with a wing of 148.5 mm; although he called it *A. s. saxatalis,* it is *sclateri* in size. Behle (1973) has recently shown that northern Rocky Mountain birds overlap and grade into those of the southwestern United States, and he merges *sclateri* with *saxatalis.* While this merger appears justifiable, birds with wings of more than 145.0 mm are nevertheless shown to be from more northern breeding populations, i.e., Montana, Colorado, and central and northern Utah.

Amazilia beryllina viola **(W. de W. Miller). Berylline Hummingbird**

SIN.: Rancho Carrizo—ad. ♀, 26 November; ad. ♂, 3 December; also (NF) ad. ♂, 8 December 1970; 2 ad. ♂♂, 17 December 1970

These records at 6000 feet are above listed upper limits of birds wintering in Sinaloa (i.e., 2500 ft.) reported in the Mexican Check-list.

Amazilia violiceps ellioti **(Berlepsch). Violet-crowned Hummingbird**

DGO.: Río Mezquital—2 ♂♂, 1 ♀, 5–6 November

The Mexican Check-list mentions this species from western Durango without details and only in the general summation.

Lampornis clemenciae clemenciae **(Lesson). Blue-throated Hummingbird**

COAH.: Puente El Chorro—4 ad. ♀♀, 1 ad. ♂, 13–14 May

The Mexican Check-list does not record this species from Coahuila; the ♀♀ were all at nests under highway bridges. Ely (pers. comm.) has found the species nesting near Las Vacas in caves and vacant buildings.

Eugenes fulgens fulgens **(Swainson). Rivoli's Hummingbird**

SIN.: Rancho Carrizo—2 ad. ♀♀, 1 ad. ♀, 1–4 December

These birds were not in breeding condition, contrary to what one might expect from the Mexican Check-list, which indicates breeding-condition specimens were taken at nearby Rancho Batel on 25 November. Crossin saw 2 adult territorial ♂♂ at La Esperanza, Nuevo León, on

4–10 May, but was unable to collect them; the species is not listed in that state in the Check-list.

Calothorax lucifer **(Swainson). Lucifer Hummingbird**

COAH.: Puente El Chorro—ad. ♀, 14 May

The Mexican Check-list does not record this species from Coahuila, but earlier van Tyne and Sutton (1937:43) and Burleigh and Lowery (1942:191) reported specimens from there; Ely (1962) considered the species common below 7500 ft. in the state and cited egg dates from 19 May to 25 July.

Archilochus alexandri **(Bourcier and Mulsant). Black-chinned Hummingbird**

COAH.: Palo Blanco—1 ad. ♂, 2 ad. ♀♀, 10–12 May

The Mexican Check-list does not record this species from Coahuila; Burleigh and Lowery (1942:191) and Miller (1955) list earlier specimens from the state, and Urban (1959:469) more recent ones.

Calypte costae **(Bourcier). Costa's Hummingbird**

SIN.: Rancho Carrizo—sub-ad. ♂, 8 November 1970; ♀?, 8 December 1970

The Mexican Check-list records only four specimens of this species from Sinaloa, at elevations of 1100 ft. or lower—versus 6000 ft. for those listed here (NF).

Calypte anna **(Lesson). Anna's Hummingbird**

CHIH.: Río Vallesa—2 ad. ♀♀, 24 and 27 October
COAH.: Palo Blanco—sub-ad. ♂, 16 December

The Mexican Check-list does not record this species from Chihuahua and Coahuila, and these specimens are the first reported from Mexico east of Sonora (see Phillips and Amadon, 1952). Zimmerman (1973) has published a recent sight record from Coahuila: a bird seen near Parras de la Fuente on 19 December 1972.

Atthis heliosa morcomi **Ridgway. Heloise's Hummingbird**

SIN.: Rancho Carrizo—ad. ♂, 13 October; 4 ad. ♂♂, 30 November and 2 December; 1 ad. and 1 im. ♂, 10–11 April (all 2 g, fat none to light); also (NF) single ad. ♂♂, 4 April 1964, 11 December 1970, and 10 January 1970

Inasmuch as this species is reported to be rare in the area, we record these additional specimens as well as some weights. This form was described on the basis of two single vagrant ♀♀ (USNM), taken in the Huachuca Mountains, Arizona, on 2 July 1896 (Ridgway, 1898).

As pointed out by Phillips (1961), the characters of *A. h. margarthae* Moore (1937), from Rancho Batel, Sinaloa, are precisely those of *morcomi* —particularly the very small spots on the throat, the paler and reduced buff on the sides, and whiter underparts. Under the circumstances, we follow Phillips in placing Moore's name in the synonymy of *morcomi*.

After having seen and compared the type and paratype, we find it difficult to understand, first, how Moore could have insisted that *morcomi* more closely resembled nominate birds (type locality: Jalapa and Coatepec, Veracruz) and, second, how this erroneous assessment could have been accepted for so long.

Selasphorus platycercus platycercus **(Swainson). Broad-tailed Hummingbird**

N.L.: La Esperanza—ad. ♀, 7 May

This specimen provides additional evidence of this species breeding in Nuevo León, as it had two burst follicles and a brood patch; in addition, a ♀ was observed building a nest at La Esperanza on 4–10 May.

Stellula calliope **(Gould). Calliope Hummingbird**

CHIH.: Río Vallesa—im. ♂, 27 October

The Mexican Check-list does not record this species from Chihuahua.

Chloroceryle americana **(Gmelin). Green Kingfisher**

C. a. septentrionalis (Sharpe)

COAH.: Puente El Chorro—2 ad. ♀♀, 14 May

The Mexican Check-list records only *C. a. hachisukai* Laubman from Coahuila, that being from the northern part of the state. Miller (1955) and Urban (1959:469-470) also list that form from the north, although the latter says that a specimen from near Múzquiz is "probably intermediate between *hachisukai* and *septentrionalis*." Our two specimens are clearly *septentrionalis*, being bluish rather than brassy green above and having much less white in the wings and on the head than *hachisukai*.

C. a. hachisukai Laubman

DGO.: Tepehuanes—1 ♀, 2 ♂♂, 12–13 November
CHIH.: Río Vallesa—♀, 26 October

The Mexican Check-list records this form without comment from Chihuahua and from only two specimens (Tamazula, 2800 ft.) in Durango. Fleming and Baker (1963:284–285) record two additional Durango specimens, taken on the Río Mezquital at Nombre de Díos; they identified these as *C. a. septentrionalis*, but as our specimens are typical *hachisukai*, we question their determination.

Sphyrapicus thyroideus nataliae **(Malherbe). Williamson's Sapsucker**

CHIH.: Mt. Mohinora—ad. ♀, 19 October
DGO.: Teneraca (21 km S, 12 km W)—ad. ♀, 27 November 1970 (NF)

The Mexican Check-list records only four other specimens from Chihuahua, and reports also appear few for Durango.

Dendrocopos villosus intermedius **(Nelson). Hairy Woodpecker**

SIN.: Rancho Liebre (ca. 2 mi. NW of Palmito)—ad. ♀, 2 June 1964

The Mexican Check-list does not record this species from Sinaloa (specimen at NF).

Sayornis phoebe **(Latham). Eastern Phoebe**

CHIH.: Parral—ad. ♀, 31 October (no fat, 20 g)

The Mexican Check-list records this species without details from Chihuahua, where it is doubtlessly rare.

Sayornis nigricans **(Swainson). Black Phoebe**

CHIH.: Río Valles—♀, 26 December
DGO.: Río Nazas—♀, 10 December
COAH.: Palo Blanco—♀, ♂, 15 December

The implication in the Mexican Check-list is that this species is only a summer resident in the northern states, although these specimens indicate otherwise. At the Río Valles, Crossin also saw several other birds in the period 25–30 December.

The Mexican Check-list records breeding birds from Chihuahua and Durango as *S. n. semiatra* (Vigors), type locality fixed as Monterey, California. Southern Coahuila birds are attributed to the nominate race, type locality given only as the tableland of Mexico. In general, we can confirm this assessment in our breeding material. The adults from Palo Blanco, Coahuila, are closer to *nigricans,* while 1 from Chihuahua (Parral) and 7 from Durango (El Salto 2, Laguna Santiaguillo, Río Mezquital) are closer to *semiatra.* However, a series of 5 birds from the Río Nazas, Durango, definitely averages having more dark streaking on the crissum than *semiatra,* and we would call these intergrades toward *nigricans.* On geographic grounds, this is not unexpected as southern Coahuila birds are close to *nigricans.*

Actually, in specimens (DMNH, USNM) examined by us, the trend of intergradation between *semiatra* and *nigricans* is even more widespread. California birds generally have the crissum immaculately white or with a few concealed dark markings, while Arizona and New Mexico specimens are less often immaculate and sometimes even have the streaking quite visible and fairly extensive. Most Chihuahua and Durango specimens in our series are like Arizona and New Mexico *semiatra,* although as just mentioned the Río Nazas birds are more heavily marked. Another more heavily marked Durango specimen is a ♀ taken on the Río Mezquital on 7 November. It resembles the more heavily marked Río Nazas birds, while 7 other birds are *semiatra.*

Sayornia saya saya **(Bonaparte). Say's Phoebe**

COAH.: Puente El Chorro—♀, 14 May

Not recorded in the Mexican Check-list as breeding in Coahuila, but this bird had laid and had a brood patch. Previous evidence of breeding in the state goes back to Burleigh and Lowery (1942:193), and recently Ely (pers. comm.) has found several nests near Las Vacas.

Tyrannus verticalis **(Say). Western Kingbird**

DGO.: El Salto 2—ad. ♀, 26 May (heavy fat, 42 g)

Only one other Durango specimen is recorded in the Mexican Check-list; our specimen apparently represents a late migrant.

Myiarchus cinerascens mexicanus **(Kaup). Ash-throated Flycatcher**

N.L.: La Esperanza—ad. ♀, 8 May (30 g, soft-shelled egg in oviduct; in pine-yucca forest at ca. 9000 ft.)

This species is not recorded from Nuevo León in the Mexican Check-list; the racial identification is provisional.

Empidonax hammondii **(Xantus). Hammond's Flycatcher**

SIN.: Rancho Carrizo—♂, 2 ♀♀, 30 November–5 December (no fat, 8.5–11 g)

DGO.: Río Nazas—♀, 8 December (no fat, 11 g)

These are additional winter records, including the first specifically for Durango, according to the Mexican Check-list.

Empidonax oberholseri **Phillips. Dusky Flycatcher**

CHIH.: Río Valles—♀, 27 December (heavy fat, 13 g)

The Mexican Check-list does not record this species in winter from Chihuahua. Also taken in winter were specimens from Sinaloa, Durango, and Coahuila. In spring this was the commonest *Empidonax* of this complex, being taken in these states and in Nuevo León as well.

Empidonax wrightii **Baird. Gray Flycatcher**

DGO.: Río Nazas—2 ♀♀, 9–10 December

The Mexican Check-list does not record this species as wintering in Durango. Crossin took only one other specimen, a ♀ near Parral, Chihuahua, on 1 November.

Empidonax affinis pulverius **Brewster. Pine Flycatcher**

SIN.: Rancho Carrizo—♀, 4 December

This species is said in the Mexican Check-list to winter only rarely in Sinaloa.

Empidonax difficilis **Baird. Western Flycatcher**

The subspecific taxonomy of this species in western Mexico is still not well elucidated, and there are indications that the reviews to date (Moore, 1940a, 1940b) have confounded more than clarified the situation. Moore described three new races along a transect from the Sierra Madre Occidental to the Pacific lowlands, i.e., *immodulatus* (type locality: Mt. Mohinora, Chih., 10,500 ft.), *bateli* (type locality: Rancho Batel, Sin., 6200 ft.), and *culiacani* (type locality: Culiacán, Sin., 55 ft.).

According to Phillips (1959:362), *culiacani* is a synonym of *difficilis*, the type specimens being migrants in an area where the species is quite unknown as a breeder. Phillips et al. (1964:88) also consider that most or all of the type series of *immodulatus* are representatives of the race *hellmayri* Brodkorb, a breeding bird of the Rocky Mountains and southward to northern Chihuahua and Coahuila. Whether the type is *hellmayri* or not, they do not state; however, we assume from the above and their placing *immodulatus* in quotes that it is indeed *hellmayri.* That leaves for consideration *E. d. bateli,* a name which the Mexican Check-list considers a synonym of *immodulatus.*

It is clear that *E. difficilis* breeds in eastern Sinaloa, and in fact the type of *bateli* was reportedly taken at a nest at Rancho Batel (Moore, 1940a). (Crossin also found a nest at nearby Rancho Liebre on 6 May 1964.) From Moore's description, *bateli* would appear to be a rather small, dark race (we have not seen the type). In our series of 12 spring specimens from Rancho Carrizo, all of the specimens are short-winged, i.e., 65.0–69.0 in ♂♂ and 63.0–65.5 in ♀♀. This makes them rather small for *hellmayri* but in the range of *bateli* (and *difficilis*). The series is quite variable in color, but three specimens stand out as being clearer (but not necessarily darker) green above and in having buffier wing bars and darker breasts than most of the other specimens (wings: ♂ 64.5; ♀♀ 64.0, 66.0 mm). Although not in breeding condition, these specimens may well represent the local breeding form (i.e., *bateli*), as they had no fat deposits—which would be expected in most migrants in mid-April. In addition, two autumn-winter birds from Rancho Carrizo are richly colored (♀♀, wings 63.5, 64.5 mm), plus two spring birds from near El Salto, Durango (♂ 65.5, ♀ 64.5 mm). These we would also call *bateli.* Thus, if our assessment is correct, *bateli* is a rather small and richly colored race, occurring at least from Rancho Batel into adjacent Durango. Based on this assessment, our specimens can be allocated as follows:

E. d. bateli Moore

DGO.: El Salto 2—♀, ♂, 21 and 24 May (ov. to 3 mm; t. 6 × 4; no fat)

SIN.: Rancho Carrizo—2 ♀♀, 29 November and 2 December; 2 ♀♀, 1 ♂, 9–10 April (ov. 5 × 3 and 5 × 2 mm, granular; t. 2 × 1.5 mm; no fat)

E. d. difficilis Baird

CHIH.: Río Santa Barbara—♀, 1 May (wing 60.5; ov. 3 × 3, granular; no fat)

DGO.: El Salto 2—♀, 25 May (wing 61.0; ov. 5 × 3, granular; no fat)

SIN.: Rancho Batel—4 ♀♀, 5 ♂♂, 6–12 April (ov. 3 × 2 to 4 × 2, granular; t. 1 × 1 to 2 × 1.5; fat none to light)

Concordia—♀, 15 April (wing 61.0 mm; ov. 4 × 2, granular; medium fat)

E. d. hellmayri Brodkorb

DGO.: El Salto 2—♂, 26 May (wing 72.0 mm; t. 6 × 5 mm; no fat)

***Camptostoma imberbe ridgwayi* (Brewster). Beardless Flycatcher**

CHIH.: Río Vallesa—♂, 28 October (no fat, light molt, 8 g)

The Mexican Check-list does not record this species from Chihuahua. Measurements are: wing 56.5, tail 49.0 mm.

Hirundo pyrrhonota melanogaster **Swainson. Cliff Swallow**

DGO.: Río Nazas—series of breeding birds, 15–16 May (♂♂ had testes at least 6 × 8 mm; ♀♀ ranged from ovary enlarging to laying)

In this series, wing lengths of ♀♀ ranged 96.5–104.5 mm and of ♂♂ 96.5–106.0 mm. Forehead colors in the series were rufous to dark brown, except for one bird that had this whitish; it had enlarged testes (11 × 7 mm), weighed 19.5 g (light fat), and had a wing of 105.0 mm.

Riparia riparia riparia **(Linnaeus). Bank Swallow**

DGO.: Laguna de Santiaguillo—♂, 22 April

The Mexican Check-list does not record this species from Durango.

Corvus corax **Linnaeus. Common Raven**

DGO.: Laguna de Santiaguillo—set of 5 fresh eggs, 23 April

The Mexican Check-list does not specifically record this species as breeding in Durango. White-necked Ravens (*C. cryptoleucus* Couch) also occurred at this locality, and a ♀ was taken on the same date (ova and ovary small).

Auriparus flaviceps ornatus **(Lawrence). Verdin**

CHIH.: Río Santa Barbara—juv. ♀ and ♂ (from nest), 30 April
COAH.: Palo Blanco—juv. ♀, 12 May

These data provide additional breeding records from these states; others for Coahuila are listed by Amadon and Phillips (1947) and Urban (1959:481).

Cistothorus platensis stellaris **(Naumann). Sedge Wren**

DGO.: Laguna de Santiaguillo—♀, 21 April (no fat, medium molt)

According to the Mexican Check-list, this northern race is recorded in Mexico only from Tamaulipas and San Luís Potosí. This form is easily distinguished from more southern races by its streaked rump.

Campylorhynchus brunneicapillus guttatus **(Gould). Cactus Wren**

CHIH.: Parral—2 juv. ♀♀, 31 October (both in post-juv. molt)

These two fledglings represent later breeding than indicated in the Mexican Check-list.

Troglodytes aedon cahooni **Brewster. House Wren**

DGO.: El Salto 2—series, including 2 incubating ♀♀, 21–28 May

The Mexican Check-list records this form in Durango only from 50 miles south of Durango. Fleming and Baker (1963:294) list additional specimens from near El Salto, as well as other localities in the state.

Salpinctes obsoletus obsoletus **(Say). Rock Wren**

COAH.: Palo Blanco—♀ (soft-shelled egg in oviduct), 4 juv., 10–13 May

The Mexican Check-list lists no breeding record of this species from Coahuila. Ely (pers. comm.) has nesting records (young) from there between 11 May and 25 June.

Melanotis caerulescens caerulescens **(Swainson). Blue Mockingbird**

SIN.: Rancho Carrizo—series, 27 November–2 December and 6–7 April

The Mexican Check-list records this species as occurring only up to 5200 ft. in Sinaloa (at nearby Rancho Batel); the above were taken at 6000 ft. at a locality where it is common and has bred (egg dates, 25 May 1963 and 28 May 1964).

Toxostoma curvirostre **(Swainson). Curve-billed Thrasher**

COAH.: Palo Blanco—3 ad. ♂♂, 14–16 December (fat none to light, 91–94 g)

The Mexican Check-list is unclear about the racial situation in this species in southern Coahuila. Compared to typical *T. c. celsum* Moore, two of these specimens are darker on the upperparts and in the ventral spotting; they may be called *T. c. oberholseri* Law. The third specimen is an intergrade, but is closer to *celsum.* Urban (1959:486) calls southern Coahuila birds *oberholseri,* while Ely (1962) says those of the southeastern part of the state are intermediate between that race and *celsum*—but closer to the latter.

Toxostoma dorsale dumosum **Moore. Crissal Thrasher**

DGO.: Río Mezquital—♂, 1 April (49 g, no fat, t. 4 × 3 mm)

Although worn, this specimen is clearly darker above and below and has a whiter throat than Arizona and New Mexico specimens of *T. d. dorsale* Henry. Moore (1941), in describing *dumosum* (from a single specimen taken at Portezuelo, Hidalgo), pointed out that the type was smaller than nominate birds. We can confirm this in our specimen, which measures as follows: wing 94, tail 122+, and culmen from nostril 27.4 mm. Five ♂♂ of the nominate race measure as follows: wings 99.5 to 102.5, tails 133+ to 136, and culmen 28.2 to 31.5 mm. Two DMNH *dumosum* from near Sombrerete, Zacatecas, are also dark and small (respective measurements: ♀ 91.5, 118+, 28.7; ♂ 93.5, 119+, 28.6), but in culmen they overlap *dorsale.*

The Mexican Check-list does not record *T. dorsale* from Durango, but Fleming and Baker (1963:295) report 1 taken 35 miles west of Mapimi on 1 July 1958. They identified their bird as the nominate race, but in light of our determination this may be questioned. Their specimen was made into a skeleton, but it still might be subspecifically identifiable on the basis of size.

Catharus guttatus **(Pallas). Hermit Thrush**

C. g. auduboni (Baird)

CHIH.: Mt. Mohinora—♂, 18 October (wing 98.0)
Río Santa Barbara—♂, 2 May (wing 98.5)
DGO.: El Salto 1—♂, ♀, 28 March (wings 103.0, 97.0)
SIN.: Rancho Carrizo—♂, 3 ♀♀, 26 November–3 December (wing 99.5; wings 95.5, 97.5, 98.0); ♂, ♀, 6 and 10 April (wings 101.5, 97.5)
N.L.: La Esperanza—2 ♀♀, 5–7 May (wings 95.0, 96.5)

C. g. oromelus (Oberholser)

DGO.: Río Nazas—♂, 8 December (wing 91.5)
SIN.: Rancho Carrizo—♀, 12 April (wing 86.0)
COAH.: Palo Blanco—♀, ♂, 12–14 December (wings 87.0, 91.5)
N.L.: La Esperanza—3 ♀♀, 5–9 May (wings 84.0, 88.0, 91.0)
CHIH.: 25 mi. W of Parral—♂, 26 April (wing 91.0)

C. g. guttatus (Pallas)

COAH.: Palo Blanco—♀, 14 December (wing 83.5)

This listing shows the distribution, dates of occurrence, and numbers taken of the three races identified in this sample of 21 specimens; *auduboni* (12 specimens) predominates, followed by *oromelus* (8) and *guttatus* (1). Taxonomy is according to Aldrich (1968) insofar as subspecies usage and recognition. We follow Dilger (1956) and others in placing all *Hylocichla* except *H. mustelina* in the genus *Catharus*. This decision is made easier by the fact that the type species of *Catharus, C. occidentalis,* is similar in behavior and morphology to the merged (non-*mustelina*) members of *Hylocichla*.

***Myadestes obscurus cinereus* Nelson. Brown-backed Solitaire**

SIN.: Rancho Carrizo—2 ad. ♂♂, 1–2 December (no fat or molt; 37, 40 g)

In the Mexican Check-list the implication is that this species winters only at 700 to 2500 ft., but Rancho Carrizo is at 6000 ft.

***Sialia mexicana amabile* Moore. Western Bluebird**

We can confirm the differences cited by Moore (1939) between this race and *bairdi* Ridgway. In our 6 ♂♂ of *amabile* from Durango and southern Chihuahua, the brown of the dorsum is darker, while below it is paler but more extensive. Also, in our series the blue of the throat and belly is paler than that of *bairdi* ♂♂. Females of *amabile* parallel ♂♂ in their color differences, but these are much less pronounced.

***Regulus calendula* (Linnaeus). Ruby-crowned Kinglet**

Phillips' (1964) recent study shows that color characters among continental populations of this species do not substantiate the existence of a greenish nominate race in the east and north and a grayer race in the west, i.e., *cinerascens* Grinnell (type locality: Mt. Wilson, California). Instead, Phillips points out that eastern and northern birds differ from those of Arizona and probably most of the western United States in being shorter-winged. On this basis, he describes the race *R. c. arizonensis* (type locality: vicinity of Phelps Ranger Station, White Mountains, Arizona). The minimum wing length of *arizonensis* is said to be 60.4 mm in males and 56.3 (+?) in females, versus maxima of 60.0 and 58.0, respectively, in recently measured eastern birds. According to Phillips, the male that is the type of *cinerascens* measures 60.0 mm in wing length; therefore, he considers this form a synonym of *R. c. calendula*.

We find Phillips' basis for considering the type of *cinerascens* as measurably the same as *R. c. calendula* to be open to question. In the first place, the determination of whether the type represents a member of a short- or a long-winged population rests on less than a half millimeter—in a worn spring bird at that. Second, Phillips (1964:235) admits that two of the ♂♂ specimens from his series (DMNH) from the White Mountains measure less than the 60.4 mm given as the minimum of *arizonensis*. These we have seen, one measured by Phillips as 59.9 and the other as 59.5/60.4 mm; our measurements of them are both 59.5 mm. Phillips contends that these two specimens are probably migrants from farther north (they were taken on 14 and 17 September) and leaves them out of his measurements of *arizonensis*. Actually the two are in the final stages of molt, and like the six longer-winged September (8 to 23) specimens in the type series, they probably do represent local birds. We also measured summer topotypical ♂♂ of *arizonensis*; and while most exceed 60.4 mm in wing length, one taken on 2 July measures 59.5/60.0 (Phillips' figure 60.4).

The point is that minimum wing lengths in *arizonensis* include rather than exclude the type of *cinerascens*. As this is the case, and if a long-winged western race is to be recognized, it should bear the name *cinerascens*—with *arizonensis* a synonym. Before the question of a western race can be satisfactorily answered, we feel that more study is needed, particularly of measurements from populations across *all* of North America. Meanwhile, we think it best to accept Phillips' contention that no color races exist among continental populations of *R. calendula*; furthermore, we suggest that both *cinerascens* and *arizonensis* be synonymized with *calendula*, pending eventual clarification of mensural variation in continental populations. Should a longer-winged race be recognized, along mensural lines given by Phillips, our specimens could be segregated as follows (wing >60mm/<60mm): Chihuahua—10/6, Durango—2/6, Sinaloa—1/3, Coahuila—0/4, Nuevo León—0/1.

***Bombycilla cedrorum* Vieillot. Cedar Waxwing**

DGO.: Río Mezquital—3 ♀♀, 4 April (from flock of 50+)

The Mexican Check-list does not record this species from Durango.

***Vireo atricapillus* Woodhouse. Black-capped Vireo**

SIN.: Rancho Carrizo—♀, 12 April (no fat, 7 g)

The latest spring record for Sinaloa is 20 March, according to the Mexican Check-list.

***Vireo griseus micrus* Nelson. White-eyed Vireo**

CHIH.: Río Santa Barbara—♂, 28 April

The Mexican Check-list does not record this species from Chihuahua, nor is it reported from northern Mexico west of Coahuila and San Luís Potosí. The measurements are: wing 55.5 and tail 45.0 mm.

Vireo huttoni **Cassin. Hutton's Vireo**

V. h. carolinae Brandt

N.L.: La Esperanza—2 ♀♀, 5–7 May (no fat, 12 g, brood patch)

The Mexican Check-list records no evidence of breeding of this species from Nuevo León.

V. h. stephensi Brewster

CHIH.: Mt. Mohinora—♂, 18 October (no fat, 12 g)

The Mexican Check-list does not record this form above 8500 ft., but this record is at 10,200 ft.

Vireo bellii medius **Oberholser. Bell's Vireo**

DGO.: Río Nazas—♀, 16 May (egg in oviduct, brood patch)

CHIH.: Río Santa Barbara—2 ♀♀, 5–7 May (both with brood patches, one with egg in oviduct)

The Mexican Check-list does not record definite evidence of breeding of this species in these two states. Earlier, Amadon and Phillips (1947) reported a nest with young on the Río Nazas on 25 April 1946.

Vireo solitarius **(Wilson). Solitary Vireo**

V. s. solitarius (Wilson)

COAH.: Palo Blanco—♂, 2 ♀♀, 12–16 December

The Mexican Check-list does not record this form from Coahuila; Urban (1959:492–493) lists one other specimen from the state.

V. s. cassinii Xantus

COAH.: Palo Blanco—♂, 12 December

DGO.: Laguna de Santiaguillo—2 ♂♂, 5 ♀♀, 19–24 April

The Mexican Check-list does not record this form from Coahuila; however, Van Hoose (1955) has reported a specimen taken there on 4 July 1954. Urban (1959:493) corrects the date given by Van Hoose to 4 April 1954 and adds one other Coahuila specimen to the record—a bird taken on 12 May 1954. Our Durango specimens represent late spring records from that state, where recorded in the Check-list only to 10 April.

Peucedramus taeniatus **(Du Bus). Olive Warbler**

P. t. arizonae Miller and Griscom

CHIH.: Mt. Mohinora—3 ♂♂, 18–21 October

These are all adults with paler backs than more southern specimens (the 21 October specimen is somewhat darker, toward the next race).

P. t. jaliscensis Miller and Griscom

CHIH.: Mt. Mohinora—♀, 2 ♂♂, 17 and 21 October

DGO.: El Salto 2—♂ and 2 ♀♀ juv., 24 May (from nest 18 ft. up in a pine)

These records provide additional details on the distribution of the two races in Chihuahua and an additional breeding record from Durango. The Mexican Check-list does not recognize *jaliscensis,* instead synonymizing it with the nominate form; on the contrary, we follow Webster (1958b, 1962) in regarding this as a valid subspecies.

The Olive Warbler has long been considered a member of the Parulidae, and still is by Webster (1962) and perhaps others. However, George (1962, 1968) has marshalled evidence that at least argues for the removal of *Peucedramus* from this family, if not in its placement near the Sylviidae. We shall not review the evidence, except to say that Webster's characters of the hard palate do not appear to us to maintain *Peucedramus* in the Parulidae. Hubbard has examined wood warbler (Parulidae) skulls (UMMZ) and is impressed with the homogeneity among typical members of the family, which is not shared with them by *Peucedramus.* Webster's (1962:420) own figure illustrates marked differences between a *Dendroica* and the Olive Warbler, in spite of his emphasis to the contrary. On the other hand, his contention that *Peucedramus* is not a sylviid is worth considering, and it may be a mistake to insert this genus into any extant family. A separate family or at least subfamily might be more appropriate.

Mniotilta varia **(Linnaeus). Black-and-white Warbler**

DGO.: Río Nazas—♂, 9 December (no fat or molt, 10 g)
COAH.: Palo Blanco—♂, 16 December (light fat, no molt, 10 g)
SIN.: Rancho Carrizo—♂, 1 December (no fat or molt, 10 g)

These represent additional records from areas where the species is rarely reported. Other Coahuila records are given by Urban (1959:493).

Vermivora virginiae **(Baird). Virginia's Warbler**

SIN.: Rancho Carrizo—♂, 10 April (no fat, 7 g)

This warbler is recorded as rare in Sinaloa in the Mexican Check-list.

Vermivora crissalis **(Salvin and Godman). Colima Warbler**

At La Esperanza, Nuevo León, 4–10 May, Crossin found this species a frequent visitor at agave (*Agave* sp.) flowers, along with hummingbirds, *Icterus parisorum,* and other species, where it appeared to be taking nectar.

Dendroica petechia **(Linnaeus). Yellow Warbler**

DGO.: Río Nazas—♂, 16 May (t. 2 × 2 mm, heavy fat, 10.5 g)
Río Mezquital—6 ♂♂, 1–4 April (t. 4 × 4 to 6 × 5 mm, no fat, 8.5–9.5 g, several birds singing)

The first record is of *morcomi* Coale, and those from the Río Mezquital are *sonorana* Brewster, neither of which race is recorded in the Mexican Check-list from Durango. D. Miller (1906) attributed a ♂ and a ♀ from Río Sestín, taken 11 and 14 April 1903, to *sonorana,* although the ♀ was longer-winged than Arizona birds.

***Dendroica tigrina* (Gmelin). Cape May Warbler**

CHIH.: Parral—im. ♂, 1 November (no molt or fat, 9 g)

This is the first record from Mexico outside the Yucatan Peninsula, according to the Mexican Check-list.

***Dendroica coronata* (Linnaeus). Yellow-rumped Warbler**

D. c. coronata (Linnaeus)

DGO.: Laguna de Santiaguillo—♀ (wing 68.5 mm), im. ♂ (wing 76.0 mm), 14–15 November

Río Nazas—♀ (wing 68.5 mm), 10 December

The Mexican Check-list records this form without details from Durango, where it appears to be quite rare. We have seen only one other specimen from there, an im. ♂ (wing 73.0 mm) taken at Rancho Guasimal, 6 mi. west of Birimoa, on 30 October 1937 (MC). Using characters given in Hubbard (1970), this specimen and the ♂ above cannot be attributed to a given population, but the 2 ♀♀ taken by Crossin are small and thus from the population breeding east of Alaska and the Yukon.

D. c. nigrifrons Brewster

We have seen breeding birds of this race from throughout western Chihuahua and from Durango southward to the El Salto area (including Las Rucias, La Ciudad, Las Adjuntas, Nievero, Cerro Prieto, and Hacienda El Coyote). These were taken in the period 21 March to 27 September. The only winter specimens that we have seen were from the Nevado de Colima, Jalisco, where W. B. Richardson took a ♀ and a ♂ on 8 and 14 December 1889 (BMNH). Other specimens from Nevado de Colima were taken by J. H. Batty, i.e. 7 ♂♂ on 10–27 September 1905 (AMNH).

In the Mexican Check-list, *nigrifrons* is reported to have been taken on 22 February at Nievero, Durango (MC). We could find no specimens of any form of *D. coronata* from Nievero on that date, either in the collection or the catalog, nor any winter specimen of *D. c. nigrifrons* from any locality. We assume an error was made, either in the data or the identification or both.

The Check-list records a specimen of *nigrifrons* from Xichú, Guanajuato, on 20 April (= 7 mi. northwest of Xichú, ♂, 20 April 1939), but the bird is clearly *D. c. auduboni* (MC). Webster (1958a) has also erroneously ascribed a specimen of *D. c. auduboni* to *nigrifrons*, the bird in question being a ♀ taken 4 mi. south of Laguna Valderama, Zacatecas, on 24 September 1955 (CAS). To date we have confirmed *nigrifrons* only from Chihuahua and Durango (spring into autumn) and from Jalisco (autumn and winter). We would also like to point out that occasional *D. c. auduboni* occur in the mountains of western Mexico in summer; i.e., a first-year ♂ (already in post-nuptial molt) taken 12 mi. east of

La Junta, Chihuahua, on 12 June 1949, and a ♀ taken 4 mi. east of Uruapán, Michoacán, on 5 July 1939 (both MC).

***Seiurus aurocapillus cinereus* Miller. Ovenbird**

DGO.: Río Nazas—♀, ♂, 9 December (no molt or fat; s.n.o.; 14.0, 18.5 g)

The Mexican Check-list does not record this subspecies from Durango.

***Seiurus noveboracensis* (Gmelin). Northern Waterthrush**

DGO.: Río Nazas—♂, 10 December (no molt or fat, 17 g, s.n.o.)
Laguna de Santiaguillo—♂, 23 April (no fat, 16.5 g)

The Mexican Check-list does not record this species from Durango. We follow Eaton (1957) in not recognizing any races in this species.

***Wilsonia pusilla* (Wilson). Wilson's Warbler**

W. p. pileolata (Pallas)

COAH.: Palo Blanco—♀, 3 ♂♂, 12–15 December

The Mexican Check-list and Urban (1959) do not record this form as wintering in Coahuila; also found in winter in Durango on the Río Nazas (2 ♀♀, 3 ♂♂, 4–10 December).

W. p. pusilla (Wilson)

DGO.: Río Nazas—2 ♂♂, 8 December
Laguna de Santiaguillo—♀, ♂, 13–14 December
Río Mezquital—♀, 3 ♂♂, 5–8 November
CHIH.: Río Vallesa—♀, 25 October
Río Santa Barbara—♀, 2 ♂♂, 26–29 April

The Mexican Check-list does not record this race from Chihuahua and Durango.

***Setophaga ruticilla* (Linnaeus). American Redstart**

DGO.: Laguna de Santiaguillo—♂, 14 November (no molt or fat, s.n.o., 6 g); 2 ♂♂, 20–21 April (fat none to light, 7–8 g)

The Mexican Check-list does not record this species from Durango. We do not recognize any races in this species.

***Molothrus aeneus loyei* Parkes and Blake. Bronzed Cowbird**

DGO.: Presa Francisco Zarco—2 ♂♂, 17–19 May (no fat, 63 and 67 g, t. 10 × 7 and 12 × 10 mm)

According to the Mexican Check-list, this species is known from Durango only on the basis of sight records, these being near Mezquital on 26 July and near Durango on 21 June 1950 (Webster and Orr, 1952). Crossin observed several of these birds at the above locality, plus a few at the nearby Río Nazas on 15–18 May. These specimens are the easternmost of this western race that we know of from Mexico. We follow Parkes and Blake (1965) in placing *Tangavius* in *Molothrus*; this necessitated the renaming *T. a. milleri* van Rossem as given above.

Molothrus ater **(Boddaert). Brown-headed Cowbird**

M. a. obscurus (Gmelin)

This is the breeding race of Mexico, including the northern Plateau. All spring cowbird specimens (11 taken 29 April–16 May) in our series from Chihuahua, Durango, and Coahuila are this form, based on measurements (see Table 1) and the slender bill. Only one *obscurus* was taken in the autumn (Río Vallesa, Chih.: im. ♀, 23 October), the rest of the series of 29 birds being the following race.

M. a. artemisiae Grinnell

CHIH.: Río Vallesa—12 ♂♂, 8 ♀♀, 22–28 October
DGO.: El Salto 1—7 ♂♂, 2 ♀♀, 21 November

Based on measurements (Table 1), virtually all of the larger cowbirds collected in autumn can be assigned to this race (type locality: Quinn River Crossing, Humboldt Co., Nevada). The lone exception is a molting ♀ (Río Vallesa, 28 October), the bill width of which is 8.7 mm —which is somewhat wide for *artemisiae*. However, the bill is not particularly massive and we do not regard the bird as typical *M. a. ater*; perhaps it is an intergrade between that race and *artemisiae*. The other

Table 1: Measurements of Brown-headed Cowbirds from Breeding Grounds*

Samples	N	Wing length (mm)†			Culmen length (mm)‡			Mandible width (mm)†		
		$\bar{x}$	S.D.	Range	$\bar{x}$	S.D.	Range	$\bar{x}$	S.D.	Range
Males										
artemisiae										
Great Basin	20	112.1	2.7	107.0–118.0	12.3	0.5	11.4–13.0	9.1	0.4	8.5–9.6
Great Plains	20	111.6	2.8	107.0–117.0	12.2	0.5	11.1–12.9	9.2	0.3	8.7–9.8
ater										
Eastern U.S.	24	108.7	1.9	105.5–112.0	11.5	0.7	10.2–12.8	9.6	0.3	9.2–10.3
obscurus										
S. Arizona	11	100.5	1.7	98.0–103.5	10.6	0.8	9.7–12.1	8.1	0.3	7.7–8.6
Females										
artemisiae										
Great Basin	18	100.2	1.3	98.0–102.5	10.5	0.6	9.2–11.3	8.4	0.3	7.5–9.2
Great Plains	9	99.7	1.7	97.5–102.0	10.6	0.2	10.3–11.0	8.1	0.2	7.7–8.4
ater										
Eastern U.S.	22	97.5	2.4	92.0–101.5	10.3	0.4	9.7–11.1	8.8	0.2	8.4–9.2
obscurus										
S. Arizona	12	91.0	2.2	86.5– 93.5	9.2	0.3	8.6– 9.8	7.5	0.3	6.7–7.6

* Specimens in USNM, MCZ, and DMNH.

† Measurements of subspecies significantly different in Mann-Whitney U tests (Steel and Torrie, 1960), P all $< .05$ and often $< .01$ (H: $\bar{x}_1 = \bar{x}_2$); measured from nostril.

‡ Subspecies significantly different, except for Great Basin *artemisiae* and *ater* females, where P $> .05$ (H: $\bar{x}_1 = \bar{x}_2$); measured at base between rami.

specimens have bill widths generally in the range of *artemisiae*, i.e., 8.6–9.4 mm in ♂♂ and 7.4–8.4 mm in ♀♀ (culmen lengths 9.9–12.1 in ♂♂, 9.3–10.6 in ♀♀). Wing lengths of measurable specimens are: 5 ad. ♂♂ = 111.0–115.5; 3 im. ♂♂ = 106.0–110.0; 4 ad. ♀♀ = 103.0–109.0; 1 im. ♀ = 101.0 mm. These wing lengths are also in agreement with measurements of *artemisiae* (Table 1). All of the October specimens are in molt, while the November ones—except for one bird—have completed it.

Cassidix mexicanus **(Gmelin). Boat-tailed Grackle**

DGO.: Río Nazas—3 ♀♀, 16–17 May (all with brood patches and burst follicles in the ovaries)

The Mexican Check-list reports this species without detail from Durango, but the above may be the first evidence of breeding there. The Check-list mentions specimens (MC—not seen) of the race *C. m. monsoni* (Phillips) from this state, but these from Río Nazas appear to be *monsoni* × *prosopidicola* (Lowery) in coloration and measurements. D. Miller (1906) reported winter specimens from Rosario and La Boquilla, calling them "*macrourus*."

Icterus spurius **(Linnaeus). Orchard Oriole**

CHIH.: Río Santa Barbara—5 ♂♂, 3 ♀♀, 29 April–2 May
DGO.: Laguna de Santiaguillo—2 ♂♂, 21 and 24 April
Río Nazas—1 ♂, 2 ♀♀, 15–17 May

We have tried to assess these specimens subspecifically on the basis of the revision of Mexican *I. spurius* by Dickerman and Warner (1962). They described as *I. s. phillipsi* (type locality: 1 mi. W of Acámbaro, Guanajuato) the breeding birds from central Durango and southward, while considering those from northeasternmost Durango and northward to be the nominate race. The latter is regarded as including *I. s. affinis* Lawrence, a population of smaller birds occurring in southern Texas and adjacent Mexico. *Phillipsi* is said to differ from *spurius* in having the juveniles paler below and grayer above and the adult ♂♂ darker chestnut. *Phillipsi* is further differentiated from adjacent *spurius* (i.e., "*affinis*") in having the wing and tail longer; there is clearly no significant difference in these measurements between *phillipsi* and U.S. *spurius*, although the average in tail length in ♂♂ of the latter is smaller, i.e., 67–73 versus 70–79 in *phillipsi*.

None of our series of ♂♂ is darker than the darkest of a series of six eastern U.S. *spurius*, nor do any of the specimens of ♂♂ or ♀♀ exceed the maximum tail length of *spurius* (including "*affinis*"). Therefore, we would call them all *I. s. spurius* on the basis of color and measurements. This is not particularly surprising, as our material could well be transient *spurius* en route from wintering grounds in Pacific Mexico—where the species winters in numbers as far north as Nayarit and Sinaloa

(Phillips, 1961)—to the eastern United States. Some could also be "*affinis*" on or near its breeding grounds (particularly those with short wings or tails), and thus distinguishable from more eastern *spurius*. These would include ♂♂ from Río Santa Barbara (wing 75.5 mm) and Río Nazas (wing 73.5 mm). If breeding, the latter specimen, a bird with testes 9 × 6 mm, no fat, and taken on 15 May, would apparently be the first definite record of "*affinis*" in northeastern Durango. (The map of Dickerman and Warner [1962] shows northeastern Durango shaded to indicate the occurrence of "*affinis*," but the only record shown is a circle rather than a dot; we assume that the former is a sight record and the latter a specimen, a distinction that is not made in the paper.) Two ♀♀ taken there at the same time have enlarged ovaries (7 × 3 and 9 × 4, ova to 3 mm) and no fat deposits; their wings (both 72.0 mm) are near the lower limit of the two larger populations and could well refer them to "*affinis*."

Dickerman and Warner (1962) also show a dot in Sinaloa on their map of breeding ranges, perhaps referring to the specimen (MC—not seen) cited in the Mexican Check-list (Culiacán, 17 June), but they do not supply a name for it. To the north, in Sonora, we have seen several specimens that could represent breeding birds; these are all the size of "*affinis*." These specimens (DMNH) are ♂♂ as follows: 9 mi. N of Ciudad Obregón, 28 June 1959, t. 9 × 6, no fat (wing 74.6); 3 mi. NNE and 1 mi. WNW of Navajoa, 27 April 1957, t. 4 ×3, slight fat (wing 71.0); essentially same locality, same date, t. 7 × 4, slight fat (wing 70.0).

***Icterus cucullatus* Swainson. Hooded Oriole**

CHIH.: Río Santa Barbara—♀, 29 April (ov. 4 × 3, gran.; no fat; 19 g)

The Mexican Check-list records this species (as the race *I. c. nelsoni* Ridgway) from Chihuahua without details. This specimen is similar in color to that race, but it is small (wing 76.5, tail 77.5 mm). It might represent the population of smaller birds of southern Sonora, called *I. c. restrictus* van Rossem; this form is considered a synonym of *nelsoni* in the Check-list. This species would appear rare on the Plateau in Chihuahua and in Durango.

***Icterus parisorum* Bonaparte. Scott's Oriole**

SIN.: Rancho Carrizo—♂, ♀, 4 December and 29 November (no molt, fat none to light, 33 and 40 g, s.o. and s.n.o.); ad. ♂, 1 March 1964 (NF)

In the Mexican Check-list, this species is said to winter in the tropical lowlands, but these records are at 6000 ft. in oak woodland.

***Icterus galbula* (Linnaeus). Northern Oriole**

CHIH.: Parral—4 ♂♂ (t. 5 × 9, enlarged clocal protuberance; 8 × 12; 6 × 12, enl. cl. prt.; and 8 × 14. No fat)

DGO.: Laguna de Santiaguillo—2 ♂♂ (t. 8 × 12 and 8 × 13. No fat)

In view of the fact that *I. g. bullockii* (Swainson) and *I. g. abeillei* (Lesson) intergrade on the Mexican Plateau, the characteristics of the above probable breeding birds are of interest. The Mexican Check-list indicates that intergradation between these forms occurs in northern Durango (MC specimens), but does not specify localities. Rising (1970) indicated that an intergrade population existed at Río Sestín (= Santa María del Oro), in northern Durango, based on a series of birds collected by F. H. Batty. Interestingly, Rising (1973) has reported that he recently (30 April to 5 May 1971) attempted without success to find orioles of these forms in north-central Durango.

The four males from Parral are very close to *I. g. bullockii,* but each shows some approach to *abeillei* in one or more characters, i.e., darkened rump, darkened sides, black forehead, and/or shortened superciliary stripe. One of the males from Laguna de Santiaguillo is essentially like *bullockii* but shows an approach to *abeillei* exceeding that of any of the Parral specimens. It has distinctly darkened rump and flanks, as well as a black forehead. The other Durango male is essentially intermediate, with much darkened rump, black on the sides, forehead, and auriculars, and with a shortened superciliary line.

Icterus wagleri wagleri **Sclater. Wagler's Oriole**

DGO.: Río Mezquital—2 ad. ♂♂, 2–3 April (no fat, both 42 g, 4 × 3 and 3 × 2 mm)

This species is said in the Mexican Check-list to be resident in the highlands (although implied of seasonal shifts), but these two were taken in *Taxodium-Salix* habitat at 5400 ft.

Icterus pustulatus microstictus **Griscom. Scarlet-headed Oriole**

SIN.: Rancho Carrizo—♀, 27 November (no molt or fat, s.n.o., 34.5 g)

DGO.: Río Mezquital—♀, ♂, 2–3 April (no fat, 26 [= 36?] and 40 g, ov. 7 × 5 mm, t. 3 × 2 mm)

This species is said in the Mexican Check-list to be resident in tropical zone, but the above Sinaloa record is at 6000 ft. (in oak woodland); it is recorded in the Check-list without detail from Durango (the above records are from 5400 ft.).

Piranga flava hepatica **(Swainson). Hepatic Tanager**

SIN.: Rancho Carrizo—3 ad. ♂♂, im. ♂, im. ♀, 29 November–5 December; sub-ad. ♂, 9 December 1970

The Mexican Check-list does not record this species in Sinaloa in winter.

Piranga ludoviciana **(Wilson). Western Tanager**

DGO.: El Salto 2—♂, ♀, 24 and 26 May (no and heavy fat, 27 and 33 g)

The Mexican Check-list does not record this species in Durango in spring.

Spinus psaltria **(Say). Lesser Goldfinch**

We concur with Phillips et al. (1964) in reverting back to a subspecific nomenclature more like that in Ridgway (1901) than in the Mexican Check-list and most other current literature. This would mean that the name *S. p. psaltria* (type locality fixed at Colorado Springs, Colorado) would apply to all populations with green or mixed green and black backs in adult ♂♂, the reason being that topotypical birds are primarily of these types. Synonyms are *S. p. hesperophilus* (Oberholser), type locality San Bernardino, California, and *S. p. arizonae* (Coues), type series from Ft. Whipple, Arizona, and Ft. Wingate, New Mexico. The earliest available name for northern black-backed (adult ♂) populations is *mexicanus* Swainson (Real del Monte, Hidalgo, Mexico). Birds of the latter form range into the U.S. in southern Texas, with at least occasional variants of *S. p. psaltria* that are black-backed enough to be indistinguishable from *mexicanus* occurring as far north as southern Arizona, New Mexico, and eastern Colorado.

In Mexico, green-backed or intergrade specimens (MC) are said in the Check-list to have been taken on the Plateau southwest to northwestern Chihuahua (La Junta), and apparently as a vagrant to Durango (Guanceví). The La Junta specimens are not, however, from the locality west of Chihuahua, i.e., in "northwestern" (= central-western) Chihuahua. According to Chester Lamb's field notes (MC), this La Junta is in the southwestern part of the state, at the junction (i.e., *junta*) of the Río Chinipas and Río Fuerte, just north of Choix, Sinaloa. Thus these green-backed or intergrade specimens extend the range of *psaltria* even farther, and Crossin took an intermediate ♂ even beyond that—in southwestern Durango—at the Río Mezquital on 4 November (four others from there, taken 3–7 November, are quite close to *mexicanus*, but have some green mottling on the back). He also took two typical *psaltria*, along with an intergrade, on the Río Vallesa, Chihuahua, on 23–28 October.

All of the preceding Crossin specimens are post-breeding and could be migrants, but we suspect that they reflect the pattern of plumage variation that exists on the northern Plateau, i.e., green-backed or intergrade birds in the north gradually giving way to black-backed birds in the south. In spring, we have series of birds that are close to *mexicanus* (some with green mottling on the back) as follows: 7 ♂♂ from Laguna de Santiaguillo (15–17 May) and single ♂♂ from the Río Nazas, Durango (24 April), and Palo Blanco, Coahuila (12 May). The Mexican Check-list records the black-backed race at several localities in Durango, as well as in "southern" (= central) Chihuahua at Chihuahua and Carmen (= Ricardo Flores Magón; cf. Anderson, 1972). Urban (1959:505) and Ely (pers. comm.) also record black-backed specimens from Coahuila.

Oberholser (1903) and others suggest that ♂♂ in some black-backed populations of *S. psaltria*, the back may be green for some time before becoming fully black. We have examined specimens from black-backed populations of Mexico (DMNH) and do not find this to be the case; in the specimens that we have seen, young ♂♂ molt from green to black backs in the prenuptial molt. Whether this holds true in all populations remains to be seen, but we suspect that it is—Oberholser not withstanding.

Cardinalis sinuatus sinuatus **Bonaparte. Pyrrhuloxia**

COAH.: Palo Blanco—juv. ♂ and 2 ♀♀, 11 May (from nest 7 ft. up in mesquite)

DGO.: Presa Francisco Zarco—♀, 19 May (15 mm ovum in oviduct)

These represent early-in-the-season breeding records. D. Miller (1906) also records breeding in May in Durango, at Rancho Baillón.

Pheucticus ludovicianus **(Linnaeus). Rose-breasted Grosbeak**

DGO.: Río Mezquital—sub-ad. ♂, 31 March (no fat, light molt)

The Mexican Check-list does not record this species from Durango nor from anywhere else in northwestern Mexico.

Pheucticus melanocephalus **(Swainson). Black-headed Grosbeak**

P. m. melanocephalus was taken in the spring in Chihuahua, Nuevo León, and Durango, and at Rancho Carrizo, Sinaloa, on 26 November, 4 December, and 7–10 April. *P. m. maculatus* (Audubon) was taken only in spring and at the last locality, comprising four of seven specimens from there in early April.

Guiraca caerulea eurhyncha **Coues. Blue Grosbeak**

DGO.: Río Mezquital—juv. ♀, 6 November

This represents late-in-the-season breeding; the specimen is full-grown and in the post-juvenal molt.

Passerina amoena **(Say). Lazuli Bunting**

DGO.: Río Mezquital—series, 3–8 November

The Mexican Check-list records this species from Durango without comment. In the series are six adults that have completed the molt and one that is in the last stages; one immature is in light and two are in heavy molt.

Passerina versicolor **(Bonaparte). Varied Bunting**

DGO.: Río Mezquital—2 ad. and 1 im. ♂♂, 4–8 November

These represent additional specimens of this species from Durango, where recorded in the Mexican Check-list from Nombre de Diós (nominate form) and the extreme northwestern part of the state (*P. v. dickeyae* van Rossem). Our immature ♂ is rich brown and we presume it—as well as the two adults—to be *dickeyae*.

***Passerina ciris pallidior* Mearns. Painted Bunting**

DGO.: Río Nazas–2 ad. ♀♀, 9 December

The Mexican Check-list does not record this species from Durango.

***Spiza americana* (Gmelin). Dickcissel**

DGO.: Laguna de Santiaguillo–♂, 18 November (no molt or fat, 29 g, s.n.o.)

The Mexican Check-list does not record this species from Durango.

***Atlapetes virenticeps verecundus* (Moore). Green-striped Atlapetes**

SIN.: 7 mi. NNE of Rancho Carrizo–2 ♂♂, 11 April (no fat, t. 7 × 6 mm; 39 and 40 g)

This species was taken only at 6200 ft. in a deep, dark, permanently watered barranca and was decidedly rare. Only three specimens are listed from Sinaloa in the Mexican Check-list–all from nearby Rancho Batel.

***Pipilo fuscus* Swainson. Brown Towhee**

P. f. potosinus Ridgway

N.L.: La Esperanza–juv. ♀, 5 May (no fat, 37 g)

The Mexican Check-list records this form as breeding only in late July in Nuevo León.

P. f. perpallidus van Rossem

DGO.: El Salto 2–ad. ♀, 23 May (brood patch, just finished laying)
CHIH.: Parral–juv. ♂, 31 October

In the Mexican Check-list, breeding of this form is listed as June and August in Durango and May–August in Chihuahua; the above juvenile is full-grown and in the post-juval molt. D. Miller (1906) also records breeding in Durango in May.

P. f. mesoleucus Baird

CHIH.: Buenaventura–2 ♀♀, 27 December
Represo El Tintero–♀, 22 December

These specimens extend the range of this race southward slightly in Chihuahua, based on information given in the Mexican Check-list. They show a slight approach to *P. f. perpallidus*, which is paler, grayer, and slightly smaller than *mesoleucus* (van Rossem, 1934).

***Ammodramus sandwichensis* (Gmelin). Savannah Sparrow**

Three races were present in the large series taken at Laguna de Santiaguillo, Durango, 14–18 November and 19–24 April. Most common were *A. s. nevadensis* (Grinnell) and *A. s. anthinus* (Bonaparte), and the former also taken at Represo El Tintero, Chihuahua, on 22–24 December. Also present at Laguna de Santiaguillo was *A. s. "rufofuscus"* (Camras), with seven taken in the period 15–18 November and a larger series from 19–24 April (the latter mainly in light to heavy molt). Crossin noted that "*rufofuscus*" stayed mainly in the wetter grassy areas near the lake, while the paler types (*nevadensis* and *anthinus*) were more in the dry uplands. The race *anthinus* is not recorded in the Check-list from Durango. We regard *rufofuscus* as a synonym of *brunnescens* Butler, for reasons given in Hubbard (1974).

Pooecetes gramineus confinis **Baird. Vesper Sparrow**

Winter specimens were taken in Chihuahua (Represo El Tintero and Río Valles), where reported only in September in the Mexican Check-list. Two of these specimens (♂ ♂, 24 and 26 December) are rather darker and redder above and have heavier dorsal streaking; these may represent *P. g. altus* Phillips. *Confinis* was also taken in Durango during migration (15–16 November and 4–22 April), the localities being Laguna de Santiaguillo and the Río Mezquital.

Aimophila ruficeps **(Cassin). Rufous-crowned Sparrow**

Aimophila ruficeps phillipsi **new subspecies**

Type DMNH 13,198, adult female, collected at Rancho Carrizo, 6½ miles west of Palmito, Sinaloa, on 28 November 1971, by Richard S. Crossin (collector's number 5072).

Diagnosis: This is a very dark race, much darker than the two contiguous ones, i.e., *simulans* (type locality: Mina Abundancia, Sonora) to the north and east and so-called *fusca* Nelson (type locality: Ezatlán, Jalisco) to the south in Nayarit (where actually an undescribed race occurs). In fresh plumage, *phillipsi* differs from *simulans* in having the ground color of the upperparts darker and more grayish brown (near Broccoli Brown [capitalized colors from Ridgway, 1886]); the dorsal streaking and crown darker, less reddish brown (between dark Walnut Brown and Seal Brown); the wings and tail darker, redder brown; the breast and sides of head darker, more grayish brown (Broccoli Brown); and the flanks and crissum darker. Size is similar, but *simulans* is slightly shorter in wing and tail. Compared to Nayarit "*fusca*," *phillipsi* has the ground color of the upperparts darker and grayer (less reddish), the dorsal streaking and crown darker and browner (much less reddish), the wings and tail darker and redder brown, the breast and sides of head darker and grayer, and the flanks and crissum darker. Size of two is similar.

Measurements: type—wing 58.5+ (molting), tail 60.5, culmen from nostril 8.1 mm, weight 18 g.; 10 males (mean, standard deviation, range)—wing 60.4±1.6 (58.0–62.0), tail 62.9±3.0 (57.0–66.5), culmen/nostril 8.2±0.5 (7.4–9.1) mm, weight 19.3±1.8 (17.0–21.8) g; 4 females (including type)—wing 57.6±2.1 (55.0–60.0), tail 60.6±1.3 (59.5–62.5), culmen/nostril 8.5±0.4 (8.1–9.0) mm, weight 19.2±1.6 (18.0–21.0) g. (Note: Sample size of 10 males and 4 females does not necessarily mean that each measurement was computable from the full sample size for a given sex.)

Range: This distinctive, dark race appears to be limited to the barranca country on the western slopes of the Sierra Madre Occidental, in southeastern Sinaloa. It is known only from the area 6 to 15 miles west of Palmito, including Rancho Batel and Rancho Labor del Cielo. One specimen (MC) from northeastern Sinaloa (Milpillas area) shows intergradation between this race and *simulans,* although the remainder of the series from there is closer to that race than to *phillipsi.*

Etymology: Named for our friend Allan Robert Phillips.

Specimens examined: *phillipsi*—14, *simulans*—14 in fresh plumage, Nayarit *"fusca"*—6 in fresh plumage.

A. r. simulans van Rossem

CHIH.: Río Vallesa—5 ♂♂, 4 ♀♀, 24–28 October
DGO.: Tepehuanes—♂, ♀, 12 November

This series is in fresh to partly fresh plumage, with some specimens still in postnuptial or postjuvenal molt. Compared to six *simulans* from Sonora, adjacent Chihuahua, and Sinaloa, our series agrees well in coloration in six specimens; the other five have the ground color of the back distinctly paler and grayer. In addition, our series averages browner (less reddish) in dorsal streaking, and the breast and flanks are grayer (less buffy) than in most of the *simulans.* However, the latter are variable inter se, and three of the specimens are inseparable from over half (6 of 11) of our series. On this basis, we feel that our specimens are best assigned to *simulans,* although the tendency toward grayness and browner streaking could indicate intergradation with other races. For example, some of the birds approach *A. r. scottii* (Sennett) (type locality: Pinal County, Arizona) in the color of the dorsal streaking, and the grayness might also indicate some relationship with that form. We should note that the above series of *simulans* was collected between 1935 and 1956, and some of the differences between those specimens and our series are the type that foxing would produce.

A. r. eremoeca (Brown) × *pallidisima* Phillips

COAH.: Palo Blanco—♂, ♀, 15–16 December; ♀, 12 May
Puente El Chorro—3 ♀♀, 3 ♂♂, 12–14 May

Compared to similarly plumaged topotypes of *pallidisima* (type locality: Cuesta Blanca, 19 km W of Saltillo, Coahuila) and near-topotypes of *eremoeca* (type locality: Boerne, Kendall County, Texas), our two December specimens are essentially intermediate. Our May birds appear closer to *pallidisima*; but because they are worn, we cannot confidently identify them at this time. We regard *A. r. tenuirostra* Burleigh and Lowery (type locality: McKittrick Canyon, Guadalupe Mountains, Culberson County, Texas) as an intergrade population between *A. r. scottii* and *A. r. eremoeca.*

Aimophila cassinii **(Woodhouse). Cassin's Sparrow**

COAH.: Palo Blanco—♂, 2 ♀♀, 12–14 December (light molt, fat none to light, 18–19 g)

The Mexican Check-list does not record this species in Coahuila in winter, the latest date being 20 November.

Junco hyemalis **(Linnaeus). Dark-eyed Junco**

J. h. caniceps (Woodhouse)

CHIH.: Río Vallesa—4 ♀♀, 27–28 October

The Mexican Check-list gives no specimen records of this form from Chihuahua. At the same locality and date, an adult ♀ *caniceps* × *mearnsi* was taken, the bird being dorsally like *caniceps* and ventrally like *mearnsi.*

J. h. mearnsi Ridgway

CHIH.: Río Vallesa—♀, 28 October
DGO.: Tepehuanes—♀, 12 November

The Mexican Check-list does not record this form from southern Chihuahua nor from Durango. The Chihuahua bird is slightly darker above and on the sides and has more rufous wing edgings than the Durango specimen, but both are typical of the race.

Spizella passerina **(Bechstein). Chipping Sparrow**

As would be expected, the race *S. p. arizonae* Coues was found as a widespread migrant and wintering bird on the northern Plateau, with winter specimens from Chihuahua (Represo El Tintero), Sinaloa (Rancho Carrizo), Durango (Río Nazas), and Coahuila (Palo Blanco). The darker and dorsally more heavily streaked *S. p. atremaeus* Moore was found in Chihuahua (Río Vallesa, 24 and 28 October), Sinaloa (Rancho Carrizo, 28 November and 1 December), and Durango (El Salto area, 22 November, 25–26 March, and 23–28 May). Birds closely resembling this race were also found at lower elevations in Durango, one on the Río Nazas (8 December) and one at Laguna de Santiaguillo (4 November). The May series from El Salto represents breeding *atremaeus,* with a ♀ collected at nest and one taken with enlarged oviduct and laying on 23 May. This series is rather variable in color of the upperparts, with five birds being as pale as some *arizonae* and the other five being darker; all are more broadly streaked above than typical *arizonae.*

Spizella pallida **(Swainson). Clay-colored Sparrow**

DGO.: Río Mezquital—2 ♀♀, 8–10 November
Laguna de Santiaguillo—2 ♀♀, 13–16 November; 3 ♀♀, 19–23 April
COAH.: Palo Blanco—♀, 2 ♂♂, 12–16 December

These records are listed in view of the apparent decline in numbers farther north, e.g., in Arizona (Phillips *et al.,* 1964).

Zonotrichia leucophrys **(Forster). White-crowned Sparrow**

The Mexican Check-list records this species from Chihuahua and Durango without details on specimens. Crossin collected a series there in the periods 30 October–28 December and 31 March–29 April, with *Z. l. leucophrys* (includes *Z. l. oriantha* Oberholser, cf. Banks, [1964]) by far the predominant form. These were taken at Parral in Chihuahua and at Laguna de Santiaguillo, Río Nazas, and Río Mezquital in Durango. In addition, three immature *Z. l. gambelii* (Nuttall) were taken, recognizable by their whitish lores and paler, more yellowish (versus dusky) bills, compared to *leucophrys*. Two of these were taken on the Río Valles, Chihuahua (26–28 December), and one at Laguna de Santiaguillo, Durango (13 November). The Mexican Check-list lists only one other specimen of this race from Durango and gives no data on the relative proportions of races in Chihuahua.

Melospiza lincolnii lincolnii **(Audubon). Lincoln's Sparrow**

A dozen winter specimens were taken in Chihuahua (Río Valles, 28 December), Sinaloa (Rancho Carrizo, 2–3 December), Durango (Río Nazas, 9 December), and Coahuila (Palo Blanco, 13 December). These vary from dark brown to light grayish brown, with various intermediates. Otherwise found to be a numerous migrant (equally variable in color), with the latest specimen taken from near El Salto, 25 May. We follow Phillips *et al.* (1964) in synonymizing *alticola* (Miller and McCabe) with the nominate race.

Melospiza georgiana ericrypta **Oberholser. Swamp Sparrow**

DGO.: Laguna de Santiaguillo—♀, ♂, 14–15 November; series, 19–24 April
Río Nazas—♂, 11 December
CHIH.: Río Santa Barbara—♂, 30 April
Río Vallesa—♂, 26 October

The Mexican Check-list does not record this species from these states, and the only other record given from northwestern Mexico is from Sonora; the latter is apparently based on a record of one seen near Caborca by Phillips and Amadon (1952). All of the autumn and winter birds had unossified skulls.

Melospiza melodia montana **Henshaw. Song Sparrow**

CHIH.: Río Valles— ♂, 3 ♀♀, 27–28 December

The Mexican Check-list records this as an occasional winter visitant to northwest Chihuahua. All of these birds had ossified skulls.

SUMMARY

Among the records reported here are several of species that are rare or unusual anywhere in the northern Mexican Plateau–Sierra Madre

Occidental region. These include breeding records of *Otus flammeolus* (Nuevo León) and *Asio otus* (Nuevo León), specimens of *Calypte anna* (Chihuahua, Coahuila), *Aix sponsa* (Durango), *Cistothorus platensis* (Durango), *Dendroica tigrina* (Chihuahua), *Spiza americana* (Durango), and *Melospiza georgiana* (Chihuahua, Durango), and sight records of *Mergus serrator* (Chihuahua) and *Buteo brachyurus* (Sinaloa).

Additional first records, according to the Mexican Check-list are as follows (forms marked with an asterisk are known from a state on the basis of other published reports): Chihuahua — *Coragyps atratus* (sight), *Buteo regalis* (sight), **Otus asio, Stellula calliope, Camptostoma imberbe, Vireo griseus, Wilsonia p. pusilla, Icterus cucullatus, Junco c. caniceps*; Durango—*Aechmophorus occidentalis* (sight), *Pelecanus erythrorhynchus* (sight), *Phalacrocorax olivaceus* (sight), *Chen caerulescens* (sight), *Anser albifrons* (sight), **Accipiter cooperii, Pandion haliaetus* (sight), *Limnodromus scolopaceus, Calidris minutilla, Recurvirostra americana* (sight), *Aegolius acadicus, Riparia r. riparia, *Toxostoma dorsale, Bombycilla cedorum, Dendroica petechia sonorana, D. p. morcomi, Seiurus aurocapillus cinereus, S. noveboracensis, Wilsonia p. pusilla, Setophaga ruticilla, Molothrus aeneus* (first specimens), *Pheucticus ludovicianus, Passerina ciris, Junco hyemalis mearnsi*; Sinaloa—*Otus flammeolus, *O. trichopsis, Dendrocopos villosus*; Coahuila—**Lampornis clemenciae* (breeding), **Calothorax lucifer, Chloroceryle americana septentrionalis, *Vireo solitarius cassinii, *V. s. solitarius* (also first breeding of *Charadrius vociferus, Sayornis saya*); Nuevo León—*Myiarchus cinerascens* (breeding).

In addition, taxonomic comments are given for *Callipepla squamata, Zenaida asiatica, Aeronautes saxatalis* (and *A. s. sclateri* is added to the Mexican list, i.e., in Coahuila and Durango), *Atthis heliosa, Sayornis nigricans, Empidonax difficilis, Toxostoma dorsale, T. curvirostre, Sialia mexicana, Regulus calendula, Peucedramus taeniatus, Molothrus ater, Icterus spurius, Spinus psaltria, Ammodramus sandwichensis,* and *Aimophila ruficeps*; in the last species, *A. r. phillipsi* is described as a new race from Sinaloa. Finally, habitat and altitudinal data are given for certain species, while records are cited for a number of species whose numbers have declined, i.e., *Anas diazi, Coragyps atratus, Cathartes aura, Falco peregrinus, Rhynchopsitta pachyrhyncha,* and *Spizella pallida.*

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GEOGRAPHIC VARIATION IN NON-CALIFORNIA POPULATIONS OF THE RUFOUS-CROWNED SPARROW

*John P. Hubbard**

INTRODUCTION

Aside from Ridgway's (1901:246-253) treatment, no review of any large segment of the populations of the Rufous-crowned Sparrow (*Aimophila ruficeps*) has ever been published. In this paper, I review populations from all but California and Baja California, i.e., from Arizona to Oklahoma and southward to southern Oaxaca. Over this range, the Rufous-crowned Sparrow occurs in grassy shrublands and similar habitats on slopes and other rough country, from near sea level to elevations of 7,000 feet or more. As far as I have been able to determine, the species is essentially resident throughout the above range, although some altitudinal movement may occur during the year.

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MATERIALS AND METHODS

Relatively fresh (variously and mainly early autumn to early winter) specimens are essential for the proper assessment of coloration in this species, as wear, fading, and other changes obscure characters to a considerable degree—especially by late spring and summer. Foxing was not found to be a serious problem in most unworn specimens, although some reddening (as well as soiling) was found in some. For color comparisons, I assembled almost 300 specimens in largely or fully complete fresh adult (definitive) plumage: Arizona 54, New Mexico 20, Oklahoma 33, Texas 36, Sonora 24, Chihuahua 9, Coahuila 9, Nuevo León 9, Tamaulipas 14, Sinaloa 10, Durango 3, San Luís Potosí 6, Nayarit 3, Jalisco 10, Guanajuato 10, Querétaro 1, Michoacán 7, Hidalgo 2, Veracruz 2, Distrito Federal 8, Puebla 3, Guerrero 11, and Oaxaca 13.

In addition, many of the over 100 juvenal specimens that I examined were in molt and had some to many new feathers of the definitive plumage. Finally, at least some of the almost 600 additional specimens in more-worn plumage were moderately helpful in assessing populational plumage characters.

Color comparisons were made under indirect natural lighting, with specimens assembled into geographic samples on the basis of their overall similarities. Geographic samples were subjected to mensural analysis, with subsamples used when measurements or geographic consideration

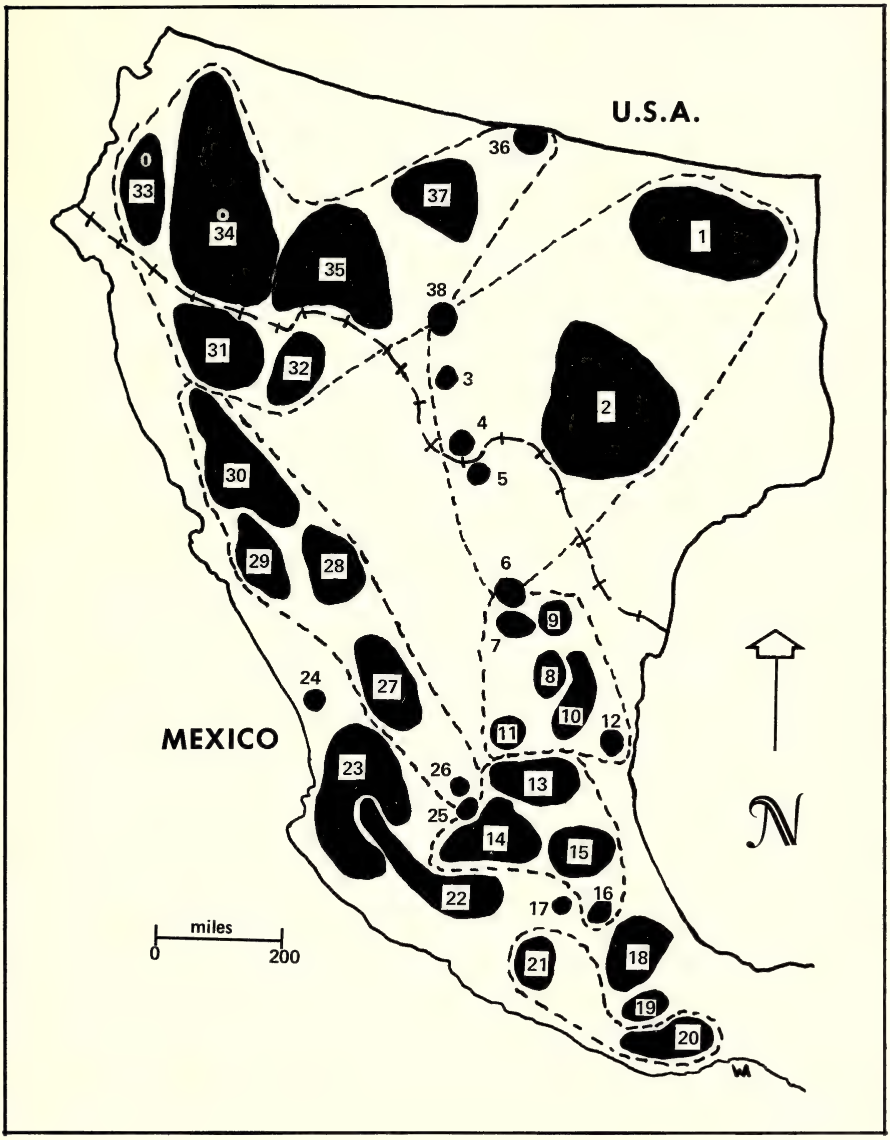

Figure 1: Populations and subspecies of *Aimophila ruficeps* (see also Tables 1 and 2). 1-5, *eremoeca*; 6, *eremoeca* × *pallidisima*; 7-12, *pallidisima*; 13-16, *boucardi*; 17 *duponti*; 18, *laybournae*; 19, *australis*; 20-21, *extima*; 22, *fusca*; 23, *suttoni*; 24, *phillipsi*; 25, *boucardi* × *simulans*; 26-30, *simulans*; 31-37, *scottii*; 38, *scottii* × *eremoeca*.

suggested a need for such division (Fig. 1). Measurements used were length of wing (chord), tail, and culmen (from nostril), as well as bill depth and mandible width at the base. (Body weights were also accumulated, but too few were available to analyze in detail.) No attempt was made to segregate mensurally the age classes of definitively plumaged specimens, and wing and tail length are included from grown juveniles.

Means ($\overline{X}$) were calculated for all measurements, along with standard deviation (S.D.) for samples of five or more specimens. Where means were more than one S.D. apart, I used the Mann-Whitney U tests (Steel and Torrie, 1960) to compare populations. The level for significant was set at .05. In general, adjacent populations were found not to differ significantly in measurements, and in most cases the values are presented in the Subspecies Accounts with little comment (see Variation in Measurements and Tables 1 and 2).

Table 1: Wing (Chord) and Tail Lengths (mm) in Subspecies and Populations of *Aimophila ruficeps*

Subspecies and	MALES						FEMALES					
	Wing			Tail			Wing			Tail		
Populations	*N*	*Mean*	*S.D.*	*N*	*Mean*	*S.D.*	*N*	*Mean*	*S.D.*	*N*	*Mean*	*S.D.*
eremoeca												
1. C Oklahoma	21	65.6	1.6	16	68.7	2.2	12	62.3	1.9	10	65.5	2.3
2. C Texas	39	64.8	2.2	19	66.6	2.2	18	61.8	1.4	11	65.4	3.0
3. Davis Mts.	18	65.0	2.4	11	66.0	3.1	6	61.6	2.5	2	64.7	—
4. Chisos Mts.	18	65.0	1.9	11	68.2	2.3	13	62.5	1.5	8	66.2	2.4
5. Sa. del Carmen	7	64.1	2.4	5	68.3	2.0	2	59.2	—	1	60.0	—
eremoeca × *pallidisima*												
6. S Coahuila	2	64.0	—	1	69.0	—	3	60.0	—	3	65.7	—
pallidisima												
7. Saltillo	12	64.4	3.0	8	69.0	2.6	12	61.3	0.9	10	67.6	1.8
8. C Nuevo León	18	62.7	1.6	10	66.0	1.8	7	59.9	1.3	3	62.8	—
9. Monterrey	10	62.9	2.0	8	64.1	2.4	8	60.9	3.6	7	63.1	3.0
10. SW Tamaulipas	36	62.2	2.4	21	63.4	3.6	10	60.6	1.7	4	62.7	—
11. N S. L. Potosí	5	62.1	1.9	5	64.9	2.0	2	60.5	—	2	67.5	—
12. SE Tamaulipas	9	60.0	2.1	9	60.8	2.0	9	58.8	2.6	5	59.4	2.0

boucardi												
13. S S. L. Potosí	20	64.9	2.5	14	66.3	4.1	3	60.0	——	1	65.5	——
14. Guanajuato	11	65.0	1.6	8	68.1	1.2	5	62.6	1.6	4	67.2	——
15. Hidalgo	18	64.7	2.2	11	68.4	4.2	4	59.7	——	4	63.6	——
16. C Puebla	4	64.0	——	3	67.0	——		————			————	
duponti												
17. Distrito Federal	14	66.1	1.7	7	71.4	2.2	5	65.0	1.3	5	69.5	3.4
laybournae												
18. S Puebla	13	62.1	2.7	12	63.6	2.7	3	62.9	——	3	61.2	——
australis												
19. C Oaxaca	5	60.5	2.4	5	61.7	0.8	3	58.8	——	3	60.0	——
extima												
20. S Oaxaca	11	61.6	2.5	11	63.1	4.1	12	58.9	4.1	10	61.5	2.0
21. Guerrero	36	60.9	1.9	9	62.1	3.0	27	60.2	2.5	14	62.8	2.4
fusca												
22. Michoacán	17	63.6	1.6	14	63.6	2.5	18	60.2	1.4	12	61.9	3.5
suttoni												
23. Nayarit	36	61.4	2.2	30	60.7	2.7	15	58.9	2.9	11	59.6	3.2
phillipsi												
24. SE Sinaloa	10	60.4	1.6	8	62.9	3.0	5	57.6	2.1	5	60.6	1.3
boucardi × *simulans*												
25. N Guanajuato	7	63.4	1.6	7	65.2	2.3	3	61.5	——	2	66.2	——
simulans												
26. Jalisco	3	60.8	——	2	66.2	——	2	60.2	——	1	61.5	——
27. SW Durango	14	64.8	1.3	8	68.8	3.0	5	62.0	2.1	5	64.9	4.3
28. NW Durango	10	62.4	0.9	10	64.8	4.0	7	60.9	1.9	8	62.5	4.8
29. NE Sinaloa	14	60.6	1.8	13	61.5	2.9	9	57.6	1.6	6	60.0	1.4
30. S Sonora	22	63.2	2.2	12	64.8	3.1	13	59.7	2.2	7	61.3	2.6
scottii												
31. N Sonora	32	64.7	1.9	12	68.4	3.3	14	62.0	1.1	9	66.8	1.6
32. NW Chihuahua	4	64.6	——	2	68.5	——	5	61.6	2.5	3	62.7	——
33. W Arizona	13	65.0	2.2	11	69.5	2.9	6	61.6	1.8	5	67.3	1.7
34. C Arizona	31	65.5	1.6	25	68.9	2.8	23	63.2	2.1	19	67.1	2.3
35. SW New Mexico	22	65.4	2.0	12	70.8	2.2	6	62.4	1.2	2	67.0	——
36. W Oklahoma	7	67.9	2.9	3	74.3	——	5	64.2	2.3	4	69.6	——
37. E New Mexico	5	66.9	1.6	2	70.0	——	2	66.7	——	1	70.0	——
scottii × *eremoeca*												
38. Guadalupe Mts.	4	66.4	——	3	74.2	——	7	63.6	1.7	3	67.2	——

Table 2: Bill Measurements (mm) of Subspecies and Populations of *Aimophila ruficeps*

Subspecies and Populations	Males									Females								
	Length			Width			Depth			Length			Width			Depth		
	N	*Mean*	*S.D.*	*N*	*Mean*	*S.D.*	*N*	*Mean*	*S.D.*	*N*	*Mean*	*S.D.*	*N*	*Mean*	*S.D.*	*N*	*Mean*	*S.D.*
eremoeca																		
1. C Oklahoma	24	8.7	0.5	25	6.4	0.3	23	6.4	0.2	10	8.5	0.5	10	6.2	0.1	7	6.4	0.2
2. C Texas	38	8.5	0.4	37	6.2	0.3	30	6.3	0.2	17	8.5	0.4	17	6.1	0.3	15	6.2	0.3
3. Davis Mts.	11	8.5	0.3	11	6.2	0.3	10	6.1	0.2	4	8.1	—	4	6.0	—	2	6.1	—
4. Chisos Mts.	17	8.6	0.4	18	6.1	0.2	11	6.1	0.2	10	8.6	0.3	10	6.2	0.2	7	6.0	0.3
5. Sierra del Carmen	6	8.4	0.4	6	6.0	0.2	6	6.2	0.3	2	8.3	—	2	6.0	—	1	6.0	—
eremoeca × *pallidisima*																		
6. S Coahuila	2	8.2	—	2	6.1	—	2	5.9	—	3	8.3	—	3	6.1	—	2	6.1	—
pallidisima																		
7. Saltillo	10	8.7	0.3	9	6.2	0.3	8	6.1	0.3	11	8.4	0.2	11	6.2	0.3	9	5.9	0.2
8. C Nuevo León	12	8.7	0.2	12	6.2	0.3	10	6.3	0.2	7	8.6	0.4	4	6.2	—	2	5.8	—
9. Monterrey	10	8.6	0.4	9	6.4	0.4	6	6.3	0.3	8	8.6	0.4	8	6.3	0.3	7	6.2	0.3
10. SW Tamaulipas	33	8.6	0.4	34	6.3	0.3	30	6.3	0.2	10	8.5	0.5	10	6.1	0.3	6	6.2	0.3
11. N San Luís Potosí	5	8.6	0.2	5	6.5	0.1	4	6.3	—	2	8.3	—	2	5.8	—	2	6.0	—
12. SE Tamaulipas	9	8.9	0.3	8	6.3	0.3	7	6.3	0.3	9	8.7	0.4	9	6.3	0.2	8	6.2	0.2
boucardi																		
13. S San Luís Potosí	21	8.2	0.4	21	6.2	0.2	19	6.2	0.2	3	8.8	—	3	6.6	—	2	6.1	—
14. S Guanajuato	10	8.0	0.4	10	6.2	0.2	9	6.5	0.2	5	8.3	0.2	5	6.3	0.2	5	6.4	0.4
15. Hidalgo	18	8.5	0.3	18	6.3	0.3	15	6.4	0.3	4	8.5	—	4	6.2	—	3	6.2	—
16. C Puebla	3	8.3	—	2	6.3	—	3	6.4	—		——			——			——	
duponti																		
17. Distrito Federal	13	8.4	0.4	14	6.2	0.2	10	6.4	0.3	7	8.1	0.4	6	6.1	0.2	6	6.1	0.2
laybournae																		
18. S Puebla	10	8.3	0.4	10	6.2	0.2	6	6.4	0.2	3	8.6	—	3	6.3	—	2	6.1	—

australis																		
19. C Oaxaca	4	8.0	—	4	6.1	—	4	6.1	—	3	7.7	—	4	6.0	—	3	6.2	—
extima																		
20. S Oaxaca	11	8.2	0.3	11	6.3	0.3	7	6.3	0.2	12	8.1	0.4	12	6.1	0.2	10	6.1	0.3
21. Guerrero	33	8.4	0.4	30	6.2	0.3	18	6.3	0.4	23	8.5	0.4	25	6.2	0.4	17	6.3	0.2
fusca																		
22. Michoacán	15	8.1	0.4	14	6.4	0.3	13	6.3	0.3	17	8.1	0.4	18	6.2	0.3	11	6.3	0.3
suttoni																		
23. Nayarit	33	8.2	0.4	28	6.4	0.3	25	6.3	0.3	12	8.1	0.4	13	6.3	0.3	9	6.3	0.2
phillipsi																		
24. SE Sinaloa	11	8.2	0.5	11	6.3	0.2	10	6.2	0.3	4	8.5	—	4	5.9	—	3	6.0	—
boucardi × *simulans*																		
25. N Guanajuato	7	8.1	0.5	7	6.2	0.1	6	6.1	0.2	3	7.7	—	3	6.2	—	3	6.3	—
simulans																		
26. Jalisco	3	7.9	—	3	6.3	—	1	5.9	—	1	7.4	—	2	6.5	—	1	6.1	—
27. SW Durango	12	8.1	0.4	13	6.2	0.4	11	6.1	0.3	3	8.2	—	3	6.3	—	2	6.7	—
28. NW Durango	11	8.0	0.4	10	6.2	0.2	9	5.9	0.3	10	8.0	0.4	9	6.1	0.2	8	6.0	0.1
29. NE Sinaloa	14	8.0	0.3	13	6.1	0.3	14	6.1	0.2	7	8.1	0.2	7	6.0	0.3	6	6.0	0.1
30. S Sonora	20	8.4	0.4	19	6.1	0.3	14	6.2	0.2	12	8.0	0.4	12	6.0	0.3	10	6.0	0.1
scottii																		
31. N Sonora	31	8.3	0.3	30	6.1	0.2	27	6.1	0.3	14	8.1	0.3	14	6.1	0.2	10	5.9	0.1
32. NW Chihuahua	4	8.2	—	4	5.9	—	2	6.2	—	4	8.1	—	4	5.7	—	3	5.8	—
33. W Arizona	11	8.3	0.3	12	6.1	0.2	9	6.0	0.3	6	8.3	0.1	6	6.0	0.1	5	6.1	0.2
34. C Arizona	22	8.1	0.4	24	6.1	0.2	18	6.2	0.2	19	8.3	0.4	17	6.0	0.3	12	5.8	0.1
35. SW New Mexico	21	8.3	0.5	22	6.1	0.2	17	6.1	0.3	5	8.2	0.2	5	6.0	0.2	5	6.0	0.2
36. W Oklahoma	6	8.1	0.3	6	6.1	0.1	5	5.9	0.2	4	8.0	—	4	6.2	—	3	6.1	—
37. E New Mexico	3	8.2	—	3	5.9	—	2	6.2	—	2	7.5	—	2	5.9	—	2	5.8	—
scottii × *eremoeca*																		
38. Guadalupe Mts.	3	8.6	—	3	6.0	—	3	5.9	—	5	8.4	0.3	5	6.1	0.4	4	6.2	—

MOLT

Following the postjuvenal molt (partial), *A. ruficeps* appears to have only one molt per year, i.e., the postnuptial molt (complete). The latter molt occurs between late summer and late autumn, following the breeding season. In a very few specimens, I have seen scattered pin feathers in spring birds, these being on the throat and chin. A few spring specimens were encountered in which the plumage was rather fresh, suggesting that the body feathers had been recently molted. These birds were all from Jalisco (two races), i.e., Jacala, 6 and 7 March 1897 (US); San Sebastián, 22 March 1897 (US); Etzatlán, 18 June 1892 (US); and near Mazamitla, 15 May 1959 (DMNH). (See Acknowledgments for explanation of collection abbreviations.) I do not know the significance of the fresh plumage in these specimens, but obviously these birds are atypical in regard to the plumage cycle of the species as a whole.

SUBSPECIES ACCOUNTS

In the following accounts, emphasis is placed on the diagnosis and description of populations based on specimens in or assuming fresh definitive plumage. Also included are sections on measurements, juvenal plumage, specimens examined, and the ranges of populations and subspecies. My emphasis on fresh, definitively plumaged specimens has already been alluded to, i.e., characters in other specimens are obscured by wear and other factors. This obscuring of characters means that many specimens now in collections are essentially useless for subspecific identification, while others are only provisionally assignable to race. As far as juvenal plumage is concerned, I have not made an extended attempt to study and compare this in the populations in question, as samples are even less adequate in many cases than are those of fresh, definitively plumaged specimens. However, I have included brief descriptions and comparisons of juveniles, where these have been available. In general, much remains to be learned concerning the geographic variation of populations of *A. ruficeps*, and I hope that the present study is accepted for what it is: a provisional and tentative assessment.

***Aimophila ruficeps eremoeca* (Brown).** Bull. Nuttall Orn. Club, 7:26, 1882. Type locality: Boerne, Kendall Co., Texas; type not examined and location unknown to me.

Diagnosis: In typical form, *eremoeca* is quite distinct from *scottii* to the west, differing in its more olive (or brownish) gray back and narrower, less extensive, and browner (less reddish) dorsal streaking. The underparts also tend to be paler and grayer, but much overlap exists in this character. The culmen averages longer and the tail shorter in *eremoeca,* but the differences are not significant.

Description: The crown is Burnt Umber* to Vandyke Brown, but some birds have this redder and a few darker and browner. Dorsal streaking is variable in color, but it is typically Olive, varying to dark Hair Brown or Bister; in extent it varies from light to moderate and is usually narrow and/or diffuse (sometimes obsolete). The back is Hair Brown or paler. Breast and flanks are typically pale gray (light Smoke Gray), sometimes washed with buff. Wings and tail are light reddish brown, between Wood Brown and Mummy Brown.

Commentary: Even on the Edwards Plateau, Texas (site of type locality), variability in color exists in fresh-plumaged specimens. For example, in 14 November-January specimens, two (14.3%) have the upperparts grayer (lacking the olive-brown cast) and have the streaking redder and more extensive than in the rest of the series. Resembling these are two other specimens from farther north in Texas, i.e., one from Ranger and one from Brazos (both US). The latter is close to *scottii,* whereas the other three specimens could be regarded as intergrades. "Intergrades" also occur in the Davis Mountains (Davis Co.), Texas, but that population and those of the nearby Chisos Mountains and apparently the Sierra del Carmen, Coahuila (only April specimens seen), are close to *eremoeca. Eremoeca* probably also occurs farther southward, as southern Coahuila December specimens from 14 miles north of Saltillo (2—DMNH) and from 50 miles south of Monclova (2—MC) represent intergrades with *pallidisima.*

In Oklahoma, east of the Panhandle, specimens of *eremoeca* also display variability. Of 23 fresh-plumaged birds from there, nine (39.1%) are typical of *eremoeca,* six (26.0%) are close to *eremoeca,* three (13.0%) are intergrades, and five (21.9%) are close to *scottii.* Farther west, evidence of intergradation between *eremoeca* and *scottii* exists in populations from the Guadalupe Mountains (Texas) north to Cimarron Co., Oklahoma; however, I regard those populations as closer to *scottii,* under which race they are discussed.

In essence, then, *eremoeca* reveals some degree of variability—specifically toward *scottii*—even in specimens from the topotypical region; however, these atypical specimens are few and do not undermine the validity of the race. *Eremoeca* extends northward to Oklahoma with increasing intergradation toward *scottii,* but that northern segment is best called *eremoeca* toward *scottii.* The Guadalupe Mountains to westernmost Oklahoma birds are also intergrades, but I regard them as being closer to *scottii.* Finally, intergradation also occurs southward in Coahuila, i.e., *eremoeca* × *pallidisima.*

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* Throughout the text, capitalized colors are from Ridgway, 1886.

Measurements: See Tables 1 and 2. Average differences in geographic samples exist in all the measurements, but none is significant.

Juvenal plumage: Above rather light brown (pale Hair Brown to Broccoli Brown) with darker (to Olive) streaks, especially on the crown and back; below rather dirty white (with pale buff on the abdomen and sometimes elsewhere), with variable amounts of streaking (Hair Brown to Olive), especially on the breast. Paler and grayer (less reddish) than most *scottii.*

Specimens examined: FRESH PLUMAGE—Oklahoma: Carter Co. 1, Comanche Co. 4, Haskell Co. 1, Jackson Co. 1, Kiowa Co. 2, Murray Co. 15; Texas: Brewster Co. 1, Comanche Co. 1, Davis Co. 5, Eastland Co. 1, Kendall Co. 2, Kerr Co. 15, Kinney Co. 2, Presidio Co. 1, Valverde Co. 1, county ? 1; Coahuila: 4 (*eremoeca* × *pallidisima*). MORE-WORN PLUMAGE—Oklahoma: Blaine Co. 1, Carter Co. 1, Kiowa Co. 3, Murray Co. 6; Texas: Bell Co. 3, Brewster Co. 28, Comal Co. 1, Davis Co. 11, Edwards Co. 1, Kendall Co. 2, Kerr Co. 19, Mitchell Co. 1, Presidio Co. 1, Travis Co. 1, Valverde Co. 4, county ? 4; Coahuila: 7 (plus 1 *eremoeca* × *pallidisima*). JUVENAL PLUMAGE—Oklahoma: Comanche Co. 1, Kiowa Co. 1, Marshall Co. 1; Texas: Brewster Co. 4, Davis Co. 12; Coahuila: 1.

Range: Central Texas north to central Oklahoma (where intergrades with *scottii* to some degree) and west to western Texas (Davis and Chisos Mountains) and the Sierra del Carmen, Coahuila. Intergrades in Guadalupe Mountains with *scottii* (which see) and in southern Coahuila (north of Saltillo) with *pallidisima.* Reports of this race occurring as a migrant in eastern Mexico, e.g., Hidalgo (Jacala), Puebla (Chachapa), Tamaulipas (Guiaves), and Veracruz (Maltrata) (Miller, et al., 1957: 377), appear in error. I have examined what are probably the specimens referred to above from all of the localities except Chachapa, i.e., Guiaves (MCZ), Jacala (Sutton Collection), and Maltrata (US); all appear to be representatives of local races rather than *eremoeca.*

***Aimophila ruficeps pallidisima* Phillips.** Bull. British Ornithologist Club, 86:156, 1966. Type locality: Cuesta Blanca, 19 km. W of Saltillo, Coahuila; 3 paratypes in the Moore Collection (one examined, MC 38,727).

Diagnosis: Resembles *eremoeca,* but the back darker, the more extensive dorsal streaking duskier or browner, and the crown darker; the breast and sides are also darker and sometimes buffier than in *eremoeca.* In measurements there is complete overlap, but topotypical *pallidisima* average longer-tailed than *eremoeca*; more eastern *pallidisima* average shorter in wing and tail than western birds of this race.

Description: In topotypical *pallidisima,* the crown is dark Walnut Brown to dark Burnt Umber. The dorsal streaking is usually moderate in extent and width and moderately sharp to rather diffuse; in color this is between light Clove Brown and Olive on the average, but varies to dark Sepia and even to dark Vandyke Brown. The back is typically light Hair Brown, varying to both grayer and to darker, richer brown. The breast and flanks are near Broccoli Brown, and the wings and tail are dark Mummy Brown.

Commentary: Contrary to Phillips (1966), *pallidisima* is not *that* pale and gray a race; indeed, there are definite brownish overtones in the dorsal ground color of topotypes, and their back streaking varies from dusky gray to grayish brown. Also contrary to Phillips, *pallidisima* appears not to be restricted to arid northeastern Mexico, but instead ranges eastward through the Sierra Madre Oriental to Nuevo León and Tamaulipas—although not in typical form.

In comparing five topotypical *pallidisima* with 12 other fresh-plumaged birds from southwestern Tamaulipas (MCZ), I found that only four (33.3%) of the latter were separable on the basis of the coloration of the upperparts. The separable Tamaulipas specimens had the upperparts darker and browner and/or the streaking darker and broader. Ventrally, the separation level was higher (50.0%), but again overlap is considerable. The separable Tamaulipas specimens have the breast and flanks darker and buffier (less grayish) than *pallidisima.* Similar comparisons with seven Monterrey area specimens showed only three (about 43.0%) to be separable from *pallidisima,* along the same lines as in the Tamaulipas specimens.

While the differences between Saltillo and certain more eastern birds are real enough, there are more similarities than differences in the two populations. Furthermore, with a more complete geographical representation, I suspect that a cline would be demonstrable between the paler *pallidisima* from west of the Sierra Madre Oriental and the darker, browner variants to the east. At this point I can see no justification for splitting these more eastern populations as a separate race. If one had the option of selecting a more suitable population to name, those of Tamaulipas or Nuevo León rather than Saltillo would be preferable. However, under the circumstances there is no recourse, and the name *pallidisima* should be applied as outlined above.

I am also provisionally including here the birds of the Sierra de Tamaulipas, Tamaulipas, although I suspect that population may be racially distinct. In the rather worn specimens available to me, there is an indication that the population is redder and paler than those to the west.

Finally, I include in *pallidisima* the birds from northern San Luís Potosí, i.e., Charcas, Wadley, Coyotillos, Villar (all LSU). Birds from the southern part of that state appear darker and browner and are best assigned to *boucardi*. Intergrades between *pallidisima* (sensu lato) and *boucardi* presumably occur farther south in San Luís Potosí, and I have also seen two specimens that can be so considered from southwestern Tamaulipas, i.e., Montalunga (FM) and Guiaves (MCZ).

Measurements: In wing and tail (Table 1), a cline of decreasing length exists from the Saltillo area eastward and southward, but only between Saltillo and the Sierra de Tamaulipas is the difference in wing significant ($P < .01$; H: $\bar{x}_1 = \bar{x}_2$). Males from Saltillo are significantly longer in tail than those of all other subsamples except central Nuevo León, with the latter being intergrades. Saltillo ♀♀ are longer in tail than all others; however, lacking specimens from intervening areas (e.g., westernmost Nuevo León), I cannot rule out the possibility that Saltillo ♀♀ intergrade with populations from farther east. Should intergradation not occur in ♀♀ or be abrupt in both sexes, one would probably be justified in separating more eastern populations as a distinct race (with a shorter tail than *pallidisima)*, perhaps in spite of the overlap in color characters. In bill, all the subsamples overlap greatly in measurements.

Juvenal plumage: Compared to *eremoeca, pallidisima* is distinctly darker above (Hair Brown to almost Olive), often with streaking heavier above and below and with little buff on the underparts; the two juveniles from southeastern Tamaulipas are dark and reddish (Raw Umber to Bistre), with redder streaking and with more buff below—thus differing from *eremoeca* and the other *pallidisima* examined.

Specimens examined: Fresh plumage—Coahuila 5, Nuevo León 9, San Luís Potosí 4, Tamaulipas 14. More-worn plumage—Coahuila 18, Nuevo León 31, San Luís Potosí 2, Tamaulipas 46. Juvenal plumage—Coahuila 3, Nuevo León 8, San Luís Potosí 1, Tamaulipas 5.

Range: Southern Coahuila (intergrading northward with *eremoeca*) south to northern San Luís Potosí and eastward through Nuevo León to southwestern Tamaulipas (some intergradation with *boucardi*); provisionally included also is the population of southeastern Tamaulipas (Sierra de Tamaulipas), which may be a separate race.

Aimophila ruficeps boucardi **(Sclater).** Proc. Zool. Soc. London, 1867:1, pl. 11. Type locality: La Puebla [= Puebla, Puebla], Mexico; type in the British Museum (Natural History), 1885.2.10.488 (not examined).

Diagnosis: A distinctly brown race, darker and browner than *pallidisima,* with browner (less reddish or grayish) and often broader and sharper dorsal streaking. Overlap in size is considerable, but *boucardi* is similar in wing length, but shorter in tail, to topotypical *pallidisima.*

Description: The crown is dark Burnt Umber, varying to both lighter and darker shades. Back is Hair Brown in most birds, varying to Broccoli Brown in others. Dorsal streaking is extensive, generally broad, and rather sharp; the color is dark Prouts Brown, sometimes somewhat darker. Breast and flanks are Broccoli Brown to a grayer, paler brown, with some specimens washed with buff. Wings and tail are near dark Prouts Brown.

Commentary: Essentially homogeneous specimens were seen from San Luís Potosí (Jesús María—U.S.; Pendencia—LSU), Veracruz (Zacualpilla—KU), and Querétaro (San Juan del Río—MC), with more-or-less similar ones from Hidalgo (Portezuelo—MC), Guanajuato (Irapuato—MC; Acámbaro—DMNH), and Michoacán (Patambán—US). The less-typical series included some specimens that showed an approach to adjacent forms, but were judged nearest *boucardi.* These include a somewhat gray specimen (one of two birds) from Portezuelo, Hidalgo (MC) that approaches *pallidisima*; duller specimens from Patambán (single specimen—US) and Acámbaro (one of two birds—DMNH) that approach *fusca*; and a redder one (one of five birds—MC) from near Irapuato that approaches *simulans.*

Much more atypical than any of the above, in fact representing distinct intergradation, is a series (3 ♂♂, 2 ♀♀) from Rancho Enmedio, north of Guanajuato (MC). These specimens are somewhat worn (January), but they are clearly redder and paler than typical *boucardi.* I regard them as *boucardi* × *simulans,* the latter a race of the Sierra Madre Occidental.

Intergradation with *pallidisima* has already been discussed under that race, but this takes place in San Luís Potosí (probably) and southwestern Tamaulipas.

Regarding the type of *boucardi,* Allan R. Phillips and Ian Galbraithe kindly compared it to a series that I had sent to them as representing the possible populations from which it could have come. They concluded that the name is best applied as used here.

Measurements: Hidalgo ♂♂ average longer in tail and culmen than ♂♂ in other populations represented by samples of five or more specimens (Tables 1 and 2); the differences are not significant.

Juvenal plumage: Resembles that of *pallidisima,* but dorsally averages redder in two specimens; a Tlaxcala specimen is darker and grayer (less reddish) and more heavily streaked above than the Guanajuato specimens.

Specimens examined: FRESH PLUMAGE—San Luís Potosí 2, Hidalgo 2, Veracruz 1, Querétaro 1, Guanajuato 5 (also 5 *boucardi* × *simulans*), Michoacán 1. MORE-WORN PLUMAGE—San Luís Potosí 22, Hidalgo 19, Guanajuato 7 (also 4 *boucardi* × *simulans*), Tlaxcala 2, Puebla 1. JUVENAL PLUMAGE—Guanajuato 2, Tlaxcala 1.

Range: Southern third of San Luís Potosí, southwest to northernmost Michoacán and south through Tlaxcala and adjacent central Puebla.

***Aimophila ruficeps duponti* ssp. nov.**

Type: DMNH 40,055, ad. ♂, 3 km. W of Puente Colorado, D. F., Mexico; collected on 26 October 1968 by A. R. Phillips (orig. no. 9875).

Diagnosis: This is the darkest, grayest race of the species, differing from *boucardi* in having the back much darker and grayer, the crown darker and less reddish brown, the dorsal streaking grayer (less reddish brown), the breast and flanks darker and more grayish brown, and the wings and tail darker and less reddish brown.

Description: The crown is between Chocolate and light Seal Brown; some specimens have this paler and redder, toward dark Burnt Umber. Dorsal streaking is dark brown, closest to Prouts Brown; it is extensive and usually broad and fairly sharp (may be diffuse). The back is dark Hair Brown, paler and more grayish brown in some specimens. Breast and flanks are between Broccoli Brown and Hair Brown. Wings and tail are dark Mummy Brown.

Commentary: The series is rather uniform, although two of the eight specimens are somewhat paler above than the others and have redder crowns and dorsal streaking. These two resemble *boucardi* but are darker below and, to some degree, above.

Measurements: See Tables 1 and 2.

Juvenal plumage: No specimens seen.

Specimens examined: FRESH PLUMAGE—Distrito Federal 8. MORE-WORN PLUMAGE—Distrito Federal 8, State of Mexico 1 (very worn—assignment to *duponti* provisional).

Etymology: Named for John E. duPont, in appreciation for his support and friendship.

Range: Apparently confined to the Valley of Mexico in the Distrito Federal (Mixcoac, Pedregal, Tlalpam, Puente Colorado, City of Mexico); possibly also in adjacent Mexico (La Venta—MC).

***Aimophila ruficeps laybournae* ssp. nov.**

Type: DMNH 40,056, ♀, 5.5 km. NNE of Chapulco, Puebla, Mexico; collected on 25 December 1969 by A. R. Phillips (orig. no. 9972), prepared by Santos Farfán B.

Diagnosis: A pale race, with grayish upperparts and dusky streaking, differing from *duponti* in being much paler and from *boucardi* and more southern races in being grayish dorsally rather than reddish brown. Also shorter in wing and tail than *duponti* and *boucardi* (significantly so in regard to the former) and less extensively streaked than these races.

Description: The crown is between dark Vandyke Brown and Burnt Umber. Dorsal streaking is moderately extensive and rather narrow and diffuse; color varies, but typically dark Olive. Back is Hair Brown, with some gray to buff tones. Breast and flanks are Broccoli·Brown to more grayish brown. Wings and tail are dark Mummy Brown, washed with Olive.

Commentary: In the series of fresh-plumaged birds there is some variation, even in the two topotypes. In adjacent Oaxaca, one specimen (Tamazulapan—DMNH) is slightly darker and another (near Huajuapan de León—DMNH) is darker yet, the latter perhaps because it is in the midst of molt; another molting specimen from the latter area (MMNH) is pale. One Veracruz (Acultzingo—DMNH) specimen is darker and more reddish in its streaking than the type, but it is somewhat worn, as are two more typical specimens (Maltrata; Orizaba—both US) from there. Overall, *laybournae* is a grayish race throughout its prescribed range, although varying to some degree in darkness.

Measurements: See Tables 1 and 2.

Juvenal plumage: Resembles that of the Tlaxcala *boucardi* mentioned above and thus grayer (less reddish), darker, and more heavily streaked than the Guanajuato examples of *boucardi.*

Specimens examined: FRESH PLUMAGE—Veracruz 1, Puebla 2, Oaxaca 3. MORE-WORN PLUMAGE—Veracruz 3, Oaxaca 7. JUVENAL PLUMAGE—Veracruz 1, Oaxaca 2.

Etymology: Named for Roxie C. Laybourne, in recognition of and appreciation for her service to ornithology.

Range: West-central Veracruz (Orizaba area) west through southeastern Puebla to adjacent north-central Oaxaca.

***Aimophila ruficeps australis* (Nelson).** Auk, 14:63, 1897. Type locality: City of Oaxaca [= Cerro San Felipe], Oaxaca, Mexico; type in the USNM, 136,131 (examined).

Diagnosis: A distinctly reddish race, differing markedly in this regard from the grayer *laybournae* to the north in having the back, breast, and sides buffier and the crown, and especially the dorsal streaking, redder (less brownish or dusky). Size similar in the two races.

Description: The crown is near dark Burnt Umber. Dorsal streaking is moderately extensive, rather narrow, and fairly sharp; the color is near

Vandyke Brown. Back is near Broccoli Brown. Breast and flanks are light Broccoli Brown, and wings and tail light Mummy Brown.

Commentary: Two November specimens from 25 miles SE of Nochistlán (DMNH) are rather uniform in color, while a February specimen from 45 road miles NW of Oaxaca City (MC) is paler—as befits its more worn state. A very worn July specimen (US—type) from the same area is also pale and reddish, while a May bird from near Chicahuaxtla (CA) is dark red.

Measurements: See Tables 1 and 2.

Juvenal plumage: Similar to *laybournae,* but slightly paler, redder (less grayish), and less heavily streaked.

Specimens examined: FRESH PLUMAGE—Oaxaca 3. MORE-WORN PLUMAGE—Oaxaca 5. JUVENAL PLUMAGE—Oaxaca 2.

Range: Apparently restricted to central Oaxaca, occurring from the ridges at the northern end of the Valley of Oaxaca, north to Chicahuaxtla and near Nochistlán.

***Aimophila ruficeps extima* Phillips.** Bull. Brit. Ornithologist Club, 86:155, 1966. Type locality: 2 km. NW of Portillo Nejapa (ca. 16°34′ N, 95°57′ W); type in the DMNH, 18,521 (examined).

Diagnosis: In most specimens, *extima* is browner than either the reddish *australis* or the grayish *laybournae.* Specifically, it has the back more grayish brown and the dorsal streaking broader and browner, less reddish than *australis.* Compared to *laybournae, extima* is browner in the color of the back and in its broader dorsal streaking. The sizes of the three forms are similar.

Description: The crown is light to dark Walnut Brown. Dorsal streaking is rather extensive, broader, and generally sharp; the color varies from dark Prouts Brown to Mummy Brown. Back color is typically light Hair Brown, with some specimens buffier and others grayer. Breast and flanks are Broccoli Brown, with both paler and grayer coloration in some specimens. Wings and tail are Mummy Brown.

Commentary: This is a variable race, even in southern Oaxaca, including in the color of the crown and back and in the extent and color of the dorsal streaking. The type, from Portillo Nejapa, is a rather gray-backed bird with brown streaking. It is matched by two specimens from nearby Miahuatlán and one from San Bartolo Coyotepec (CA, DMNH). However, two other specimens from each of these localities are browner in ground color, with darker crowns and darker, redder, and more extensive streaking. These darker specimens show some approach to the redder *australis,* but they are much closer to the brown and gray *extima.*

I also include Guerrero (mainly Chilpancingo) birds in *extima,* as six of ten specimens from there agree rather closely with the type. The other four are grayer and/or more dusky-streaked above, suggesting *laybournae*; however, the Guerrero specimens differ from the latter race in averaging somewhat more brownish (less grayish) above. Finally, a February specimen from southern Puebla (Chila de Sal—UMMZ) can also be assigned to *extima*.

Measurements: In wing and tail (Table 1), the Oaxaca sample averages insignificantly larger than Guerrero birds, whereas the latter averages slightly larger-billed (Table 2).

Juvenal plumage: Similar to *australis*, but paler and grayer above in two Oaxaca *extima* and grayer yet in a Guerrero one.

Specimens examined: FRESH PLUMAGE—Guerrero 11, Puebla 1, Oaxaca 8. MORE-WORN PLUMAGE—Guerrero 51, Puebla 1, Oaxaca 16. JUVENAL PLUMAGE—Guerrero 1, Oaxaca 2.

Range: Guerrero (Cuapongo, Omilteme, Chilpancingo) and adjacent Puebla (Chila de Sal, Tehuitzingo) south through southern Oaxaca.

***Aimophila ruficeps fusca* (Nelson).** Auk, 14:62, 1897. Type locality: Etzatlán, Jalisco; type in the USNM, 135,909 (examined).

Diagnosis: A rather dark race, extensively and broadly streaked above with reddish brown, with rather dark brownish gray back, breast, and sides. Differs from *boucardi* in being much more reddish (less brownish) and more broadly streaked, with buffier back and underparts; averages somewhat shorter in wing and tail, but not significantly so.

Description: The crown is dark Burnt Umber, with some specimens either redder or darker. Dorsal streaking is extensive, broad, and moderately sharp; the color is Burnt Umber to Vandyke Brown. Back color is Hair Brown with buff tones. Breast and sides are Broccoli Brown with moderate buffy wash. Wings and tail are Mummy Brown.

Commentary: *Fusca* is rather uniform in the series presently available, varying mainly in minor details. Evidence of intergradation with *boucardi* is seen in single specimens from Michoacán (Patambán—US) and Guanajuato (Acámbaro—DMNH), but both of these are closer to *boucardi*. An intergrade with *suttoni* (see following) was seen from southern Jalisco (Los Masos—AMNH).

Measurements: See Tables 1 and 2.

Juvenal plumage: Dorsally dark and red (Mummy Brown or paler); much darker and redder (less grayish) than the adjacent *boucardi*.

Specimens examined: FRESH PLUMAGE—Michoacán 6, Jalisco 3. MORE-WORN PLUMAGE—Michoacán 25, Jalisco 1. JUVENAL PLUMAGE—Michoacán 4.

Range: Northern Michoacán and eastern Jalisco (south of Lake Chapala), intergrading to the north with *boucardi* and to the west with *suttoni*.

Aimophila ruficeps suttoni ssp. nov.

Type: DMNH 40,054, im. ♂, 24.5 miles SE of Tepic, Nayarit; collected on 24 October 1957 by A. R. Phillips (orig. no. 4618).

Diagnosis: Resembles *simulans* (described later), but in fresh plumage the back is buffier (less grayish), the dorsal streaking redder (less brownish), and the crown more often divided by buffy center stripe (this is more frequent than in any other race); wing and tail average shorter, but not significantly so. Compared to *boucardi, suttoni* is buffier above, with less extensive and redder streaking; wing and tail significantly shorter. Compared to *fusca, suttoni* is paler above and below, with less extensive and browner (less reddish) streaking. Compared to *extima, suttoni* is buffier (less grayish) on the back, with the crown darker, the dorsal streaking redder (less brownish), and the breast and sides darker and browner (less grayish). In size, *suttoni* is significantly shorter in wing and tail than *boucardi,* but it overlaps with one or more populations of *simulans* and with *fusca* and *extima.*

Description: The crown is between dark Walnut Brown and dark Burnt Umber. Dorsal streaking is moderately extensive, fairly broad, and usually sharp; the color is near Prouts Brown or somewhat redder. Back color is between Broccoli and Hair Brown, as are breast and flanks, which may be overlaid with buffy. Wings and tail are light Prouts Brown.

Commentary: Nayarit specimens are generally similar inter se, as are most of those from Jalisco; however, one of two from Autlán (DMNH) is very different, being more grayish and brown, perhaps most suggesting intergradation between *boucardi* and *fusca.* Four January-February specimens (AMNH) from near Guadalajara are somewhat worn, but appear to be close to *suttoni.*

Measurements: See Tables 1 and 2.

Juvenal plumage: Most similar to *fusca,* but dorsally darker and duskier (between Mummy Brown and Prouts Brown) in Nayarit specimens; Jalisco specimens from Bolaños and Mezquitic (both US) are similar to these, but somewhat paler above.

Specimens examined: Fresh plumage—Nayarit 3, Jalisco 7. More-worn plumage—Nayarit 29, Jalisco 7. Juvenal plumage—Nayarit 4, Jalisco 3.

Etymology: Named for George M. Sutton, in recognition of his studies of Mexican and other birds.

Range: Eastern Nayarit (Santa Teresa southward) and western and northern Jalisco; probably also in Colima, where a specimen is recorded by Schaldach (1963:97).

Aimophila ruficeps phillipsi **Hubbard and Crossin.** Nemouria, No. 14, p. 33, 1974. Type locality: Rancho Carrizo, 6.5 miles W of Palmito, Sinaloa; type in the DMNH, 13,198 (examined).

Diagnosis: A very dark race, much darker than any of the adjacent forms. Differs from *simulans* and *suttoni* in being darker, browner, and more extensively streaked above, as well as darker on the breast and sides; also darker and browner (less reddish) than the more distant *fusca* and browner (less grayish) than *duponti*. Size similar to that of *suttoni*, but wings and tail averaging shorter than in most *simulans* populations.

Description: The crown is between dark Walnut Brown and Seal Brown. Dorsal streaking is similar to crown in color; it is extensive, broad, and rather sharp. Back is near Broccoli Brown, as are breast and sides. Wings and tail are dark Mummy Brown to dark Vandyke Brown. Variation occurs mainly in the darkness of the crown and dorsal streaking, with some specimens being paler than others.

Measurements: See Tables 1 and 2.

Juvenal plumage: The one specimen seen is too worn to provide a description of this plumage in *phillipsi*.

Specimens examined: FRESH PLUMAGE—Sinaloa 8. MORE-WORN PLUMAGE—Sinaloa 7. JUVENAL PLUMAGE—Sinaloa 1.

Range: Known only from the barranca country in southeastern Sinaloa (Palmito area), but probably ranges along the western slope of the Sierra Madre Occidental.

Aimophila ruficeps simulans **van Rossem.** Bull. Mus. Comp. Zool., 77:486, 1934. Type locality: Mina Abundacia, Chihuahua [= Sonora]; type in the MCZ, 22,783 (examined).

Diagnosis: Similar to *scottii*, but slightly to notably darker throughout and averaging shorter in wing and tail (significantly so only in northeastern Sinaloa populations). Specifically, the crown and dorsal streaking average darker and browner (less reddish) in *simulans*, and the back and the breast and sides are usually darker. Compared to *boucardi*, *simulans* is redder (less brownish) on the crown and in the dorsal streaking; the latter form also tends to be paler than *boucardi* on the back, breast, sides, wings, and tail. Compared to *phillipsi*, *simulans* is much paler throughout and is less extensively streaked above. (Also see *suttoni*.) In size, *simulans* is quite variable and overlaps all adjacent races—depending on the populations compared.

Description: The crown is between Walnut Brown and Vandyke Brown. Dorsal streaking is similar in color to the crown but averages redder (less brownish); it is moderate in extent, generally fairly broad and sharp (may be diffuse). Color of the back is between light Drab and Broccoli Brown. The breast and flanks are light Broccoli Brown. Wings and tail are near light Prouts Brown.

Commentary: I have no fresh-plumaged topotypes, but variability exists in the small series of specimens from nearby areas of Sonora and Sinaloa. This variability extends to all color characters, but perhaps is most notable in the color of the back. In this character, the color varies from a rather light gray to a darker brownish gray; coloration of the crown, streaks, breast, and sides also varies (between rather light to darker) in these specimens. In the series of fresh-plumaged and post-juvenally molting specimens from farther South in Sinaloa (Milpillas, Rancho Babizos, Suratato—all MC), one specimen approaches *phillipsi* and the other two are close to *simulans.*

East of the Sierra Madre Occidental, a series of birds from southwestern Chihuahua (southwest of Hidalgo del Parral) and adjacent Durango (Tepehuanes) shows a greater tendency toward gray back color than Sonora-northern Sinaloa specimens; however, five of the eight specimens match one or more of the more western specimens, and the entire series is best referred to *simulans.* Farther south, the status of *simulans* is not yet subject to satisfactory clarification, as fresh-plumaged specimens are few. However, in discussing other races, I indicated that *simulans* characters were seen in specimens from as far south as Guanajuato (Rancho Enmedio). Based on this apparent intergradation (i.e., *simulans* × *boucardi*) and on two *simulans*-like juveniles from Zacatecas (Monte Escobedo—US, DMNH), I am provisionally extending the range of this race southward through Zacatecas to northeastern Jalisco (Lagos de Moreno—MC).

Measurements: Wing and tail length are variable among the various populations assigned to this race, with northeastern Sinaloa birds being smallest and southwestern Durango/Zacatecas being largest. Although comparisons reveal that differences are not significant, the trends suggest that Sinaloa birds are intergrades in these characters with the smaller *phillipsi,* while those from southern Durango/Zacatecas are intergrades with the larger *simulans.* Trends in bill size are less clearcut, and the differences are not significant.

Juvenal plumage: Much paler and less dusky reddish (Russet to light Prouts Brown) above than *suttoni* and paler and somewhat redder than *boucardi.*

Specimens examined: Fresh plumage—Sonora 3, Sinaloa 2, Chihuahua 9, Durango 3. More-worn plumage—Sonora 17, Sinaloa 16, Chihuahua 14, Durango 33, Zacatecas 4, Jalisco 6. Juvenal plumage—Sonora 3, Sinaloa 2, Chihuahua 9, Durango 3, Zacatecas 2, Jalisco 1.

Range: East-central Sonora (Batuc) south through northeastern Sinaloa, southwestern Chihuahua, western Durango (east of the Sierra Madre Occidental), and probably Zacatecas and northeastern Jalisco; intergrades with *simulans* in northern Guanajuato (Rancho Enmedio).

Aimophila ruficeps scottii **Sennett.** Auk, 5:42, 1888. Type locality: Pinal Co., Arizona; type in the AMNH (examined).

Aimophila ruficeps tenuirostra Burleigh and Lowery. Occ. Papers, Mus. Zool. Louisiana St. Univ., No. 6:67, 1939. Type locality: McKittrick Canyon, Guadalupe Mountains, Culberson Co., Texas; type in LSU, 3,334 (not seen).

Aimophila ruficeps rupicola van Rossem. Auk, 63:562, 1946. Type locality: north slope of the Harquahala Mountains, Yuma Co., Arizona; type in UCLA (Dickey Coll.), 33,183 (not seen).

Diagnosis: *Scottii* differs from *eremoeca* in the gray (rather than Olive) cast to the back and in having the dorsal streaks redder (less brownish) and usually broader and more extensive. *Scottii* usually has the crown and dorsal streaking paler and somewhat less brownish than *simulans* and tends to be paler overall. From *eremoeca* and adjacent populations of *simulans, scottii* does not differ significantly in size; however, *scottii* averages slightly longer in tail and shorter in bill than *eremoeca* and longer in wing and tail than *simulans* (significantly so compared to the northeastern Sinaloa population of the latter form).

Description: The crown is medium reddish brown, typically between Chestnut and Burnt Umber, but sometimes paler and redder or darker and browner (toward Walnut Brown). Dorsal streaking is similar to, to somewhat paler than, crown color; it is usually moderate in extent, fairly broad and sharp (may be diffuse). Color of back is variable, but typically pale brownish gray (near light Drab). Breast and flanks are pale grayish brown (near pale Broccoli Brown), but variable. Wings and tail are light reddish brown, near light Mummy Brown.

Commentary: In southeastern Arizona *scottii* is relatively homogeneous in its plumage coloration, but darker specimens approaching *simulans* do occur there (e.g., single birds from the Santa Rita and Huachuca Mountains—both US); I have also seen one quite pale *eremoeca*-like bird from there (Nogales area—AMNH). Westward, in the Ajo and Harquahala Mountains, darker birds are more frequent (*A. r. "rupicola"*), but these are by no means dominant. For example, five of 10

Harquahala specimens are darker on the average than more eastern Arizona *scottii,* but of these only two are darker than the extreme of *scottii.* In the Ajos, three of six are darker than average, but none exceeds the dark extreme of *scottii.* Because of the overlap in this and all other characters, I have lumped *rupicola* with *scottii.*

Southward in Sonora, *scottii* is also marked by darker specimens, e.g., in the Sierra Pinitos area (3 of 7), Sierra San Antonio (1 of 3), and Sierra Aconchi (1 of 5); however, none of these is darker than the extreme of *scottii* from southeastern Arizona. The northward limit of *simulans* is in central Sonora (Batuc), and perhaps dark specimens to the north and even in western Arizona could be regarded as intergrades between that race and *scottii.*

In northern Chihuahua I have no information on the variability of *scottii,* and that area is included in the range of this race mainly on the basis of a few rather worn specimens. However, a molting juvenile from Colonia Pacheco (MC) is assignable to *scottii* on the basis of the visible definitive plumage on the back and breast.

In southwestern New Mexico, west of the Rio Grande, specimens agree closely with southeastern Arizona *scottii,* except for one that is paler than average from Hidalgo County (Peloncillo Mts.—MSB). Eastward and northward in New Mexico exists a trend of birds being somewhat paler and grayer above and less heavily streaked than typical *scottii.* This tendency is not so prevalent that the population can be subspecifically separated from more western *scottii,* but it is nonetheless apparent. The same tendency also occurs in westernmost Oklahoma (Cimarron Co.), as well as in the Guadalupe Mountains of New Mexico-Texas (*A. r. "tenuirostra").* These birds resemble certain of the variants of *eremoeca* (i.e., those that approach *scottii*) from farther east in Oklahoma, but they occur in populations that are otherwise typical of *scottii.* I would call them *scottii,* except in the Guadalupes, where the combination of characters warrants the designation of the population as "*scottii* approaching *eremoeca.*" As for the Guadalupe Mountain birds being separable as a narrow-billed race, i.e., *tenuirostra,* I find the population to be inseparable either from Texas *eremoeca* or from *scottii* in this regard; they do average somewhat longer-billed than the latter.

From Colorado and Kansas, I have seen no specimens; but I suspect that they are close to *scottii* from Cimarron County, Oklahoma.

Measurements: Guadalupe Mountains and Cimarron County samples average larger (not significantly so) in wing and tail than those to the west. In bill, Guadalupe Mountains birds average somewhat longer than in typical *scottii* populations, but the differences are not significant.

Juvenal plumage: Similar to *simulans*, but paler on the upperparts (Broccoli Brown to pale Prouts Brown); generally redder and darker than *eremoeca*, but occasional variants of *scottii* are similar to that race, e.g., one from Greenlee Co., Arizona (DMNH).

Specimens examined: Fresh plumage—Arizona: Cochise Co. 12, Coconino Co. 1, Gila Co. 3, Maricopa Co. 2, Pima Co. 20, Pinal Co. 1, Santa Cruz Co. 6, Yavapai Co. 1, Yuma Co. 8. New Mexico: Bernalillo Co. 2, Catron Co. 2, DeBaca Co. 1, Doña Ana Co. 3, Eddy Co. 1 (*scottii* × *eremoeca*), Hardy Co. 3, Hidalgo Co. 3, Otero Co. 4. Oklahoma: Cimarron Co. 9. Texas: Culberson Co. 6 (*scottii* × *eremoeca*), El Paso Co. 1. Sonora 21. More-worn plumage—Arizona: Cochise Co. 8, Graham Co. 1, Pima Co. 7, Santa Cruz Co. 4, Yuma Co. 3. New Mexico: Catron Co. 4, Doña Ana Co. 1, Grant Co. 8, Hidalgo Co. 3, Luna Co. 2, Otero Co. 1, San Miguel Co. 1, Sierra Co. 1, Union Co. 1. Oklahoma: Cimarron Co. 1. Texas: Culberson Co. 2 (*scottii* × *eremoeca*). Sonora 24. Chihuahua 7. Juvenal plumage—Arizona: Cochise Co. 1, Greenlee Co. 1, Pima Co. 6, Santa Cruz Co. 2. New Mexico: Eddy Co. 1 (*scottii* × *eremoeca*), Grant Co. 2, Luna Co. 1. Sonora 3. Chihuahua 3.

Range: Northern Arizona (Grand Canyon), central New Mexico (Sandia Mountains), and western Oklahoma (Cimarron County) south to north-central Sonora (Aconchi, Montezuma), northwestern Chihuahua (Colonia Pacheco, Casas Grandes), and westernmost Texas (El Paso). Intergrades with *eremoeca* in the Guadalupe Mountains (Texas, New Mexico) and (individually) in the Davis Mountains, more eastern New Mexico, Oklahoma, and northern Texas.

KEY TO SUBSPECIES

This key is based on specimens in relatively fresh definitive plumage and representing more-or-less typical examples of the 12 races recognized in this study. More-worn specimens must be allocated provisionally and on the basis of geographic probability, while atypical fresh-plumaged specimens must be identified through detailed comparisons with more typical birds. This key also serves to summarize the geographic variation in plumage characters in this species and to underscore the "strange, almost haphazard geographic variations" (Phillips, 1966:156) found in this species. A summary of mensural variation is given following the key (see also Tables 1 and 2). The key begins on page 24.

1. Notably dark races, with the dorsal streaking tending to be broader and more extensive (confined to Mexico) 2

1. Distinctly less dark races, with streaking variable but usually narrower and/or less extensive (Mexico and Southwest) 4

2. Dorsal streaking and crown distinctly more gray brown; underparts mainly gray or grayish brown (little or no buff); tail 69.0 or more in ♂♂ and 64.5 or more in ♀♀ . . . . *duponti* (Distrito Federal)

2. Dorsal streaking and crown redder; underparts often with buff; tail 68.0 or less in ♂♂ and 66.5 or less in ♀♀ 3

3. Dorsal streaking and crown browner and darker; wings of ♂♂ average 60.4 ± 1.6 (58.0–62.0) and ♀♀ 57.6 ± 2.1 (55.0–60.0) . . . . *phillipsi* (southeastern Sinaloa)

3. Dorsal streaking and crown redder and paler; wings of ♂♂ average 63.6 ± 1.6 (60.5–67.0) and of ♀♀ 60.2 ± 1.4 (58.5–62.0) . . . . *fusca* (Jalisco and Michoacán)

4. Rather pale throughout, with back olive gray and dorsal streaking generally brownish or dusky and not extensive . . . . *eremoeca* (most of Texas, northern Coahuila, and all but Panhandle of Oklahoma—including some intergrades toward *scottii*)

4. Darker, more reddish streaked and/or more extensively streaked races 5

5. Back rather buffy and dorsal streaking quite reddish 6

5. Back grayer or browner and dorsal streaking browner or grayer 7

6. Averages slightly more grayish buff on the back, breast, and sides, with the dorsal streaking and crown slightly browner and paler; bill slightly larger, i.e., average ♂♂ length (from nostril) 8.2 ± 0.4, width (at base) 6.4 ± 0.3, depth 6.3 ± 0.2 . . . . *suttoni* (Nayarit, northern and western Jalisco)

6. Averages slightly buffier on the back, breast, and sides, with the dorsal streaking and crown slightly redder and darker; bill slightly smaller, i.e., average of ♂♂ length 8.0, width 6.1, depth 6.1; ♀♀ length 7.7, width 6.0, depth 6.2 . . . . *australis* (central Oaxaca)

7. Back more olive gray, dorsal streaking more grayish brown 8

7. Back clear gray, dorsal streaking more reddish brown 9

8. Dorsal streaking averages darker, grayer, and sharper; breast and sides average slightly darker; bill averages shorter in ♂♂, i.e., 8.3 ± 0.4 (8.6 in 3 ♀♀) . . . . *laybournae* (Veracruz, Puebla, and Oaxaca)

8. Dorsal streaking averages paler, browner, and more diffuse; breast and sides average paler; bill averages longer in ♂♂, i.e., 8.6 ± 0.4 to 8.9 ± 0.3, depending on the population (8.4 ± 0.2 to 8.7 ± 0.5 in ♀♀) . . . . *pallidisima* (southern Coahuila, Nuevo León, Tamaulipas, northern San Luís Potosí)

9. Paler race, including on the back, crown, dorsal streaking, breast, and sides . . . . *scottii* (Arizona, northeastern Sonora, northwestern Chihuahua, southern and eastern New Mexico, westernmost Oklahoma; intergrades with *eremoeca* in Guadalupe Mountains of New Mexico and Texas and [individually] elsewhere to the north, east, and south)

9. Darker races 10

10. Back buffier . . . . *extima* (Guerrero, adjacent Puebla, and southern Oaxaca)

10. Back grayer 11

11. Dorsal streaking and crown somewhat darker and browner; back, breast, and sides slightly darker and browner . . . . *boucardi* (southern San Luís Potosí, Guanajuato, Querétaro, northwestern Veracruz, Hidalgo, Tlaxcala, adjacent Puebla, intergrading with *fusca* in northern Michoacán)

11. Dorsal streaking and crown somewhat redder; back, breast, and sides slightly paler and grayer . . . . *simulans* (south Sonora, northeast Sinaloa, southwest Chihuahua, Durango, Zacatecas, northeast to Jalisco; intergrades with *simulans* in northern Guanajuato)

VARIATION IN MEASUREMENTS

Wing length: The populational differences between the largest and the smallest mean wing length (subsamples of five or more specimens) is only 7.9 mm in males and 7.4 mm in females. As a consequence of these small differences and the clinal nature of the variation in this character, adjacent populations and subspecies tend not to differ significantly (see Table 1). An exception is in the case of *duponti,* which is significantly longer-winged than races to the south and west, i.e., *laybournae* and *extima.* In general, the longest-winged birds are *scottii, eremoeca,* and *duponti,* while the shortest-winged are *laybournae, australis, extima, suttoni, phillipsi,* and some populations of *simulans* and *pallidisima.* The latter two races demonstrate heterogeneity in that some populations are short-winged and others are medium-winged. Thus, discordancy exists between patterns of variation in wing length and in plumage characters in some races of *A. ruficeps.*

Tail length: The populational differences between the largest and smallest mean tail length (subsamples of five or more) are 10.7 mm in males and 10.1 mm in females. In general, the variation described above in wing length also applies to the length of tail, with a few exceptions. Longest in tail are *scottii, eremoeca,* and *duponti,* plus *boucardi* and westernmost *pallidisima*; shortest are *laybournae, australis, extima, suttoni, phillipsi,* certain populations of *simulans* and *pallidisima,* plus *fusca. Duponti* is significantly larger than the adjacent *laybournae* and *extima,* plus *fusca.* Heterogeneity is again marked in *simulans* and *pallidisima,* particularly the latter, which grades from the shortest-tailed population measured (Sierra de Tamaulipas) to one of the longest-tailed (Saltillo).

Interestingly, although length of tail generally parallels that of wing in the geographic variation, selected Corner tests (Steel and Torrie, 1960) reveal that the two characters are not correlated. In view of their independent variation, one is thus not justified in a detailed treatment of the two measurements as a ratio. However, a general assessment of the relationship of mean wing length to mean tail length within populations perhaps commits no great violence to statistical theory. Based on this, what one finds is that in the longer-tailed populations a greater difference exists between lengths of tail and of wing, while in shorter-tailed populations the reverse is true. Thus, in males of *scottii,* population ratios are 93.7 to 95.1 percent, in *duponti* 93.9, and in Saltillo-area *pallidisima* 93.3; *eremoeca* and *boucardi* show less agreement with the above generalization, with respective values of 93.8 to 98.5 and 95.4 to 97.9 percent. In shorter-tailed populations, the values include eastern *pallidisima* with 96.4 to 98.7 percent, *laybournae* 99.1, *australis* 98.1, *extima* 97.6 and 98.1, *fusca* 100.0, and *simulans* (northeastern Sinaloa) 98.5; *phillipsi* is lower than expected, at 96.0 percent. Basically, what these values suggest is that tail length increases at a more rapid rate in populations than does wing length.

Bill: Length, width, and the depth of bill all border on being mosaic in their geographic variation, and no populations or races are significantly different in their measurements. *Eremoeca* and *pallidisima* have the longest average bill length, with those of the latter race from the Sierra de Tamaulipas being the extreme, at 8.9 mm in males and 8.7 in females. Elsewhere bill length averages somewhat shorter, ranging from 8.0 to 8.5 in both sexes (throughout the area studied, males and females are similar in all bill measurements, or females average slightly smaller).

In bill depth the largest means are found from Oklahoma through eastern and southern Mexico (all or parts of the populations of *eremoeca, pallidisima, boucardi, duponti, laybournae, extima, fusca, suttoni,* and probably *australis*), but the differences in means are minor, i.e., in the range 6.3 to 6.5 (males) versus 5.9 to 6.2 (males) in populations of races with smaller bill depth. Bill width essentially parallels bill depth in its geographic variation; and, as with that latter character, the differences among populations are minor (and statistically insignificant).

Body weight: Only about 10 percent of the more than one thousand specimens examined had weight data on their labels. I do not consider this sufficient for a meaningful analysis and prefer to make no generalizations concerning it; however, this does point out the need for weight data on this (and in many other) species.

SUMMARY

Geographic variation is described in the essentially resident populations of *Aimophila ruficeps* distributed from western Arizona eastward to central Oklahoma and southward to southern Oaxaca, Mexico. Based primarily on characters of relatively fresh, definitively plumaged specimens, 12 subspecies are recognized over this area, i.e., the previously described races *eremoeca, pallidisima, boucardi, australis, extima, fusca, phillipsi, simulans,* and *scottii,* plus the here-described *duponti* (Distrito Federal), *laybournae* (southwestern Veracruz to northernmost Oaxaca), and *suttoni* (Nayarit and adjacent Jalisco). The race *rupicola* is regarded as a synonym of *scottii,* and *tenuirostra* is considered an intergrade between *scottii* and *eremoeca* (closer to the former). Plumage characters are described in detail, measurements are presented and discussed, and a key to the subspecies is provided.

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A BIOBIBLIOGRAPHY OF WILLIAM HARPER PEASE, MALACOLOGIST OF POLYNESIA

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PART I

A BIOGRAPHY OF WILLIAM HARPER PEASE

by E. Alison Kay*

William Harper Pease is almost a unique figure among those nineteenth-century conchologists who dealt with the Mollusca of the Pacific Ocean. His prolific writings were based largely on a fauna much of which he himself collected and studied for 20 years. Although he is recognized by name for his tangible contribution to natural history—the description of some 500 species—a full appreciation of Pease's contribution to the knowledge of Pacific Mollusca has never been acknowledged.

Except for brief obituary notices, there are no accounts of Pease's life. The account presented in this paper has been constructed from a variety of sources: the extensive correspondence between Pease and a

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fellow naturalist, Andrew Garrett (now in the Bernice Pauahi Bishop Museum); letters written by Pease (now in the collection of the Academy of Natural Sciences of Philadelphia and in the British Museum [Natural History], London); Pease's manuscripts and catalogues in the Bishop Museum; records in the Bureau of Conveyances and in the Archives of the State of Hawaii; records in the New York Academy of Sciences, New York; and notes accompanying the Pease collection in the Museum of Comparative Zoology, Harvard University.

To the many who have contributed items of relevant information for this account, I am extremely grateful. For their help and patience, I would especially like to thank the following: Miss Agnes Conrad, State Archivist of Hawaii; Mrs. Eunice Thomas Miner, Secretary of the New York Academy of Sciences, New York; Mrs. Venia Phillips, Librarian of the Academy of Natural Sciences of Philadelphia; Miss Margaret Titcomb, Librarian of the Bishop Museum, Honolulu; and Professor Ruth D. Turner, Harvard University.

Sources for the many quotations from manuscripts and letters are cited in the usual manner. The following abbreviations are used: Academy of Natural Sciences of Philadelphia, ANSP; the Archives of the State of Hawaii, HSA; the Bernice Pauahi Bishop Museum, BPBM; the Kauai Historical Society records, KHS; the Museum of Comparative Zoology, Harvard, MCZ; the Pease-Garrett letters, P-G (except where there was more than one letter in a month, these are dated by month only); and the Royal Hawaiian Agricultural Society, RHAS.

The Early Years

William Harper Pease was born in Brooklyn, New York, in January 1824. Nothing is known of his parents or his boyhood. The first record we have of him is in the membership book of the Lyceum of Natural History of New York (now the New York Academy of Sciences), where it is noted that Pease was proposed for membership on November 8, 1841; his signature in the membership book is dated December 2, 1841. Pease was proposed for membership by C. M. Wheatley; the nominating committee of the society that approved his application included two names well known in conchology, John C. Jay and William C. Redfield. Pease maintained his membership in the Lyceum until his death in 1871, but apparently he was never an active member since his name appears neither in the lists of those attending meetings nor in the lists of committees.

In February 1848, Pease was traveling in Mexico with the army of General Scott and wrote to Dr. T. B. Wilson of the Academy of Natural Sciences of Philadelphia from Jalafal, Mexico: "Our quarters changed to this city in December. . . . we are settled down . . . to remain I think until the close of the War" (Pease-Wilson, ANSP). His assignment remains a matter of conjecture since his activities seem to have centered on collecting plants and animals for the Academy. He made extensive collections while accompanying scouting parties and also with the help of a young Spaniard "who had some taste for natural history" (Pease-Wilson, ANSP). The results of his activities were summarized by the ornithologist Cassin in the *Proceedings of the Academy of Natural Sciences*: Pease "made very interesting collections of birds, insects, and other productions of the country . . ." (Cassin, 1848). Pease's own observations "in this most delicious and agreeable climate" (Pease letter, ANSP) were recorded in his first published paper, "Observations on the Geology and Natural History of Mexico," which appeared in the *Proceedings of the California Academy of Science* (Pease, 1848).

There is a gap of almost two years before there is another record of Pease. On December 11, 1849, he arrived in Honolulu, capital of the Hawaiian Kingdom, on the brig *Planet* from San Francisco. Although the *Planet* had sailed from Boston in April of that year, Pease was not listed among the passengers and must be presumed to have embarked in San Francisco. His arrival in Honolulu was without fanfare, for his name was merely listed in a contemporary newspaper among those of other arriving passengers.

In Honolulu, Pease evidently quickly determined to make the Islands his permanent residence, for on February 11, 1850, he applied to become a citizen of the Hawaiian Kingdom,[1] and two days later he became a property owner by purchasing 125 acres of land on the island of Kauai (Goodale-Pease letter, HSA). Pease's professional training was that of a surveyor (*Pac. Comm. Adv.*, 1872), and in October 1850 he was appointed Local Agent of the Government, "for the purpose of surveying and reporting upon the quantity, quality, etc. of the government land on the island of Kauai" (Privy Council Records, October 1850, HSA). By the end of November he was resident on that island, actively engaged in his new duties. A series of communications between Pease and various government officials in Honolulu between October 1850 and September 1853 reports his activities as government surveyor and indicates his concern over the sale and utilization of land.[2] That Pease was something less than

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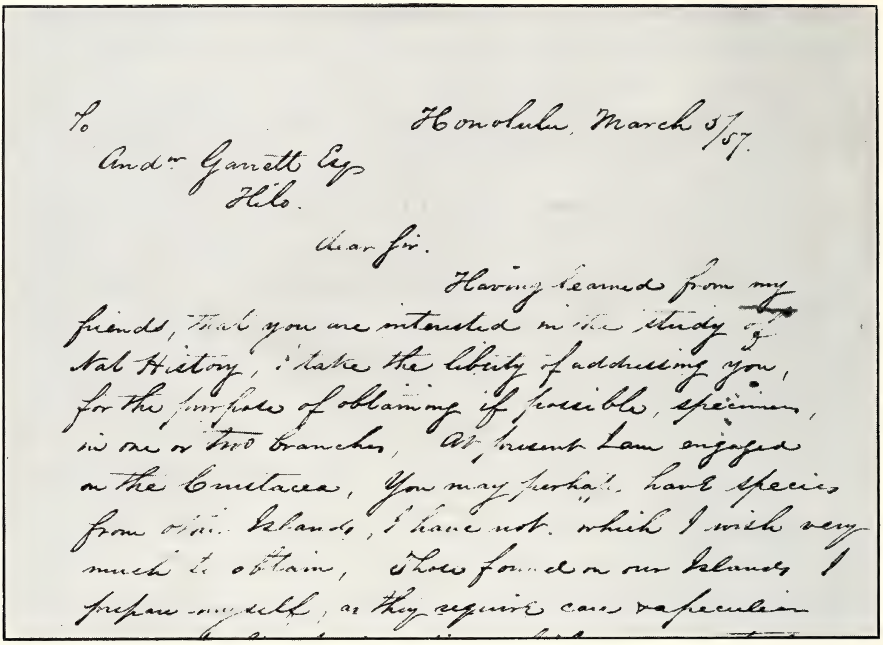
[1] Citizenship in the Hawaiian Kingdom was prerequisite to holding public office (Kent, 1965).

[2] Pease, in November 1851, suggested to the Minister of the Interior that both the *konohiki* and *kapu* systems be abolished and recommended that the remaining lands be divided among natives and early white residents married to natives (Pease-Minister of Interior letter, HSA).



To

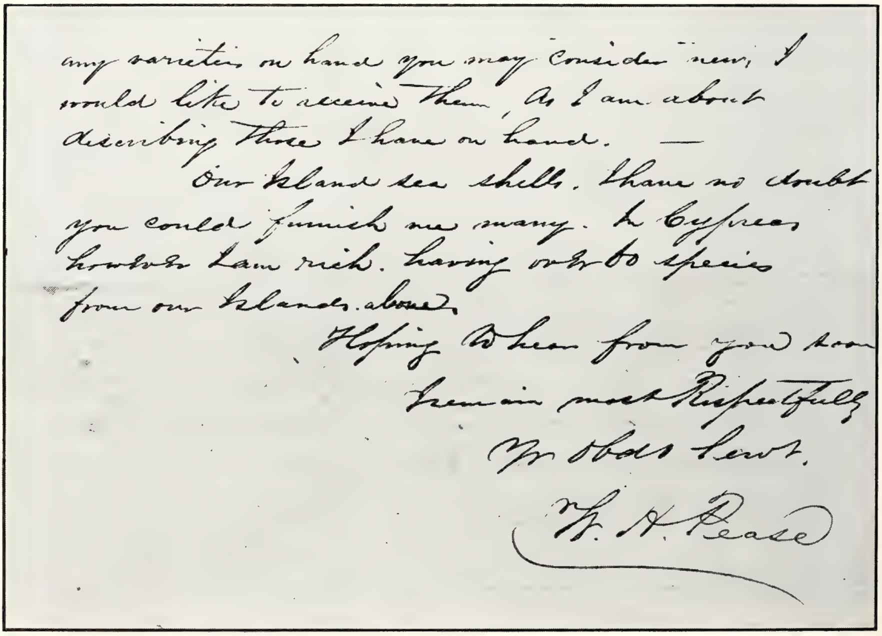
Honolulu, March 5/57.

Andw Garrett Esq
Hilo.

Dear Sir.

Having learned from my friends, that you are interested in the study of Nat History, I take the liberty of addressing you, for the purpose of obtaining if possible, specimens, in one or two branches, At present I am engaged on the Crustacea, You may perhaps have species from other Islands, I have not, which I wish very much to obtain, Those found on our Islands I prepare myself, as they require care & a peculiar

Figure 1: Two samples of Pease's handwriting taken from an 1857 letter written to his conchological friend, Andrew Garrett (1823-1887). Pease was then 23 years old. (Courtesy of the B. P. Bishop Museum, Honolulu, Hawaii.)



any varieties on hand you may consider new, I would like to receive them, As I am about describing those I have on hand. —

Our Island sea shells. I have no doubt you could furnish me many. In Cypraeas however I am rich. having over 60 species from our Islands alone.

Hoping to hear from you soon
I remain most Respectfully
Yr obdt Servt.
W. H. Pease

a success as a land surveyor was indicated by two early Kauai residents. The Reverend J. M. Lydgate (KHS) noted that "the original Pease survey was so imperfect or incorrect that it left out a thousand acres or so . . .," and Mrs. William Henry Rice commented that "guesswork figured largely in his estimates of land" (KHS). In a similar vein, but somewhat later, M. D. Monsarrat, writing to S. B. Dole, noted that Pease, who had made a survey on Molokai, "guessed at the distances mauka[3] and made very poor ones at that" (Monsarrat-Dole, HSA). A modern surveyor who has worked with the Pease data over a long period and who generally corroborates the foregoing evaluations of Pease's surveys states, however, that there are certain of Pease's surveys that suggest he did a remarkably good job, considering the limitations under which he was working (J. C. Mann, personal communication).

In January 1853, Pease assumed additional duties as Official Inspector for Horses on Kauai. He was also engaged in a number of other activities, principally involving the exchange of land and goods. John Cook (1927) and E. M. Damon (1931) note that he was one of the early sugar planters on the island, grinding his cane at Lihue mill. Cook, an English carpenter on Kauai, worked for Pease as a carpenter during Pease's cane-planting days; in his reminiscences he recalled that Pease would often be away from his land for long periods of time, leaving his carpenters and "boys" to shift for themselves (Cook, 1927). A tract of land that Pease sold in 1854 to Mr. Widemann, another of Kauai's early sugar planters, later became a portion of one of that island's largest sugar plantations, the present Grove Farm Sugar Company (Damon, 1931). In the Bureau of Conveyances of the State of Hawaii there are numerous records of transactions involving both land and goods between Pease and prominent residents, such as J. F. B. Marshall, one of the owners of Lihue Plantation on Kauai in its formative days, and Charles Reed Bishop, founder of the First National Bank of Hawaii and husband of Princess Bernice Pauahi Bishop.

Returning to Honolulu about 1856, Pease continued his association with the government of the Hawaiian Kingdom, becoming Commissioner for Water Rights and Rights of Way as well as Assessor of the City of Honolulu (*Pac. Comm. Adv.*, 1871). He applied for the position of Postmaster in 1861, but was denied the request (Pease-Kalakaua, HSA). In Honolulu, Pease was in close contact with many business and government leaders, engaging in land and property transactions with them. Prominent among his friends was Levi Haalelea, Chamberlain to the Court. The friendship apparently began about 1856; and Pease eventually not only held power of attorney for Haalelea for several years, but kept his office, library, and shell collections at Haalelea's residence opposite the Palace (P-G, June 1862). In 1865 when Haalelea died, Pease moved his library into a small structure he built adjoining his own house at 25 Liliha Street (P-G, March 1865).

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[3] *Mauka* is the Hawaiian word for "inland," or "towards the mountains."

Surveying, tax collecting, and buying and selling land and goods were but the means to an end; Pease's engrossing interest was in natural history, especially the shells of the Pacific: "That is all I think or care about" (P-G, March 1865). Isolated though he was on a small island in the Pacific, between 1857 and 1871 William Harper Pease was to publish 59 papers describing 500 species of Pacific mollusks, build a collection of shells numbering over 4000 species, amass a conchological library estimated to be worth more than $3000 in 1872 (Garrett, 1872), and disseminate specimens throughout the world. Pease wrote to his fellow naturalist in the Pacific, Andrew Garrett, "I am now in correspondence with every prominent conchologist and collector throughout the world" (P-G, March 1871).

Naturalists in the Hawaiian Islands

There were a number of students of natural history in the Hawaiian Islands in the first half of the nineteenth century. On the island of Kauai the Reverend Edward Johnson, an early missionary, had long been sending collections of shells to the east coast of the United States (Jesse Wedgewood Mighels received most, if not all, of his type specimens of Hawaiian shells from Johnson [Cooke, BPBM; Johnson, 1949]).[4] The young John T. Gulick was climbing the mountains and exploring the valleys of Kauai, Oahu, and Molokai in search of *Achatinella* during his schooldays in the 1840's (Gulick, 1932). In Honolulu, Dr. Wesley Newcomb assembled a large collection of shells during his residence in the Islands between 1850 and 1855, a collection on which he was to base his extensive publications on *Achatinella* and other Hawaiian mollusks. William Hillebrand (whose wife was Newcomb's daughter) was building a comprehensive collection of Hawaiian plants that was to make him the acknowledged master of the Hawaiian flora; and Dominique Frick, the French consular agent, was interested not only in shells but also in plants and their possible commercial products (he referred to himself as a "consulting and manufacturing chemist" [RHAS, 1856]). On the island of Hawaii, Andrew Garrett was pursuing his interest in natural history, collecting plants and animals for Newcomb, Louis Agassiz, and John G. Anthony (Spoehr, 1962).

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[4] The Mighels collection was destroyed by fire in 1854 at the Portland Museum (Maine).

Johnson, Newcomb, Hillebrand, and Frick were, with Pease, charter members of the Royal Hawaiian Agricultural Society, an institution founded in 1850 for "the promotion and improvement of agricultural operations and products in these Islands" (RHAS, 1850). At the first meeting of the Society in 1850, essays were read by Johnson and Pease, who formed a committee of two representing the island of Kauai (Pease having traveled from Kauai to Honolulu for the meetings). The Pease essay was entitled "The Value of Science Applied to Agriculture." In 1852 Pease chaired the standing Committee on Analysis of Soils and reported on the geological history of the islands and types of soil (Pease, 1852). In 1853 he sat with Newcomb and Hillebrand on the Committee on Seasons (RHAS, 1853), and in 1855 he served under Frick on the committee studying indigo (RHAS, 1855).

All five men found companionship beyond the Society in their common interest in natural history. Johnson and Pease were both interested in the shells of Kauai, where they had collected extensively. In September 1858, Pease attempted to purchase the Johnson collection (P-G, September 7, 1858), but apparently nothing came of his proposal. Two years later relations between the two men became strained when Pease felt he was ignored in discussions concerning the establishment of a professorship of natural history at Punahou School: "Johnson on Kauai will furnish me nothing, reserving anything he may suppose to be new for their Professor" (P-G, September 1860). Newcomb described Pease as "one of our young and vigorous students (Newcomb, 1869).[5] Although Pease was on Kauai during Newcomb's residence in Honolulu between 1850 and 1855, when Newcomb returned to visit the Islands in 1868, Pease wrote that he "worked with me in my collection, two weeks or more" (P-G, April 1869). Frick also discussed and exchanged shells with Pease on various occasions (P-G, September 22, 1857; November 1858). When the French consul resigned, Pease noted that his departure would "deprive science of his valuable services to our Islands" (P-G, November 1858) and bade the Frenchman a heartfelt "God speed him" (P-G, December 1858). Hillebrand's residence was next to that of Haalelea, so it was only natural that Pease should write of having "a look at Hillebrand's shells" (P-G, February 1859). Hillebrand also stimulated Pease's interest in the introduction of various plants from other regions of the Pacific, writing out a list for Pease of "those most desirable" (P-G, May 1861); and he proposed that Pease join him on a collecting trip to Ascension Island (= Ponape, Caroline Islands) (P-G, September 1862).

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[5] Of Newcomb, Pease wrote, "He is a restless spirit, not knowing where he will be found from year to year" (P-G, February 1859).

Although Gulick was later to acknowledge Pease as one of the founders of the "system of Achatinellidae" (Gulick, 1932), there are no direct records of a friendship between Gulick and Pease. There are records, however, indicating that Pease had a number of contacts with the Gulick family. In 1859 Pease received a package of shells that Gulick's father had collected on Ascension Island (Ponape), and two years later Pease served on the jury deciding old Dr. Gulick's fate in an incident involving whalers (P-G, January 1861). It is of perhaps more than passing interest that in 1861-1862 Pease mortgaged his library of 1000 books to J. T. Gulick's brother, O. H. Gulick, for $300.

In Andrew Garrett, Pease found his confidant and companion in natural history. Garrett, like Pease, had arrived in the Hawaiian Islands in the early 1850's and, like Pease, was a self-taught naturalist. Introducing himself in a letter from Honolulu in March 1857 to Garrett, who was then in Hilo, Pease wrote of "having learned from my friends that you are interested in the study of Nat History" (P-G, March 1857). Pease suggested that he would be willing to take "what duplicates you may be willing to dispose of, either in exchange or purchase" (P-G, March 1857). The suggestion evidently appealed to Garrett, who, by return mail, sent two packages of shells and corals, the first of hundreds of specimens which he was to send Pease during the next 15 years.

An agreement between the two men was apparently reached the following month when Pease wrote Garrett, "I would enter into an agreement with you to pay a certain price for every new species you may find, I to have the liberty of describing it." A close friendship between the two men soon developed, Pease entreating Garrett to "make up your mind to come down here [Honolulu] to live. It should cost you nothing & I would have some one to assist me" (P-G, September 22, 1857). A week later he wrote again: "I am in hopes to make you an offer sufficiently liberal to induce you to come down here & assist me in my studies, having a great deal of material on hand & not time to work it up" (P-G, September 29, 1857).

Within a year Garrett apparently acceded to Pease's requests and left Hawaii for Kauai where he collected for Pease, concentrating on the land shells in the valleys around Hanalei (P-G, August 1858; September 1858). In Honolulu, Pease acted as Garrett's agent, sending him supplies and mail (P-G, September 1858). But Garrett was too much of a traveler to remain content in the Hawaiian Islands. In 1859 he left Honolulu on the *Morning Star* for Micronesia, returning in January 1860. Garrett sailed again in May 1861 for Tahiti, remaining away for three years. Briefly visiting the Islands in 1864, he left again for the South Pacific, this time to remain away until his death in 1888. Garrett's trips were in part, at least, sponsored by Pease, who continued to act as Garrett's agent in

Honolulu while Garrett assiduously sent not only specimens to Pease for description, but also drawings of shells and nudibranchs for inclusion in the numerous papers Pease was writing. In March 1871 Pease proposed to purchase Garrett's shell collection, but the transaction was never completed because Pease died in June of that year (P-G, March 4, 1871; March 10, 1871).

Distressed by Garrett's absences from the Hawaiian Islands, Pease wrote of his loneliness: "Come home. Come home. . . . I dream of you often & have often been at work with you in looking over the collection, without your knowledge, & strange & odd shells have I seen" (P-G, September 1862); "Honolulu since you left, has been a lonesome place for me. Not a day passed, however without my dreaming over your fortune and success" (P-G, January 1864). Turning to his collections, his library, and his correspondence, Pease immersed himself in his work, publishing in the next seven years the bulk of his studies on Pacific mollusks.

The Pease Collection

The focal point of Pease's activities was that of amassing a collection of mollusks on which he could base his studies. The extent of his Hawaiian shell collection in 1857 is recorded in the first Pease-Garrett letter: "In land shells particularly Achatinella, my collection is complete have all described species & about 20 undescribed, *distinct* species, not such as have been described by Pfeiffer & Newcomb" (P-G, March 1857). His marine shell collection at that date must also have been fairly extensive; for in his second letter, he commented on the shells Garrett had sent him, writing that "with the exception of Cypraea scurra . . . they were all duplicates of my collection" (P-G, April 1857).

Pease's collection of Hawaiian mollusks was built largely by his own efforts, his business duties making it possible for him to collect on all the Islands. In September 1857, remarking that he had been detained on Kauai for two months longer than he had anticipated, he "spent [his] leisure in collecting shells & found a few new ones. One was an Oliva [*Oliva sandwicensis* Pease, 1861], of which I found one alive & one dead specimen"; in November 1858, he wrote of spending "a day in the mountains, where I found one new species of Spiraxis, one of Helix & two of Omalomyx"; and in March 1871, he "dredged outside of Honolulu harbor & got several new species" (P-G, March 10, 1871). The collection was put together with care: "I do not put a single specimen in my collection unless perfect. I will try & make you a visit shortly and bring you a lot of Hawaiian shells, that are perfect & beautiful, much superior to any you have seen" (P-G, March 25, 1858).

But the Pease collection was not built solely from his own and Garrett's collecting activities: "When a Captain or amateur collectors happen to find an extra fine specimen, I obtained it, cost what may" (P-G, April 1858). Through the years his contacts with collectors gradually stretched across the Pacific: "The Bishop here has written down for me to a priest there [Gambier Islands] to make as thorough a collection as possible for me. I may also mention, that I have at last found a person to collect for me at the Marquesas. He promises me to do it thoroughly. . . . I have now two correspondents there [the Fijis], one has been on an expedition to New Hebrides, Solomons, and N. E. Australia. . . . He is sending to me all the specimens, both land and marine. . . . They [a New London merchant named Williams and 'a semi cousin of mine by the name of Capt. Ben Pease'] [have] opened up the northern part of the Ralick Islands. . . . Instructions have been given to all their traders, to collect shells & I have the pick when they arrive" (P-G, February 1868). In April 1871, he wrote of having "had sent to [him] lately two large collections, one of which comprised the Papuan species" (P-G, April 1871).

The extent of his collection is also recorded: In 1868 he wrote, "I have also a complete Catalogue of Marine Gasteropodae in my Coll. They number about 3500. In so far as Polynesia is concerned, it is the largest in the world" (P-G, February 1868). Later the same year he noted, "My descriptions of new species numbers over 500, which places me as authority on Polynesian forms & of which my collection is no doubt the largest in the world" (P-G, October 1868). In 1870 Pease again recorded the size of his collection: "My marine Gasteropodae number about 4000 species. The Mediterranean, Australian, & East Indian fauna are very fully represented" (P-G, March 10, 1870).

The Pease Library

The wealth of material passing into Pease's hands presented difficulties, for there was little in the way of reference material in the Hawaiian Islands in the 1850's. He wrote somewhat dejectedly in 1857, "I am sorry to say that I can be of no assistance . . . in furnishing names of shells. I am expecting, however shortly, Reeve's work on the Cypraeas" (P-G, April 1857). Three years later, however, he wrote to Garrett, "It would do your heart good to look over my library" (P-G, January 1861). In 1868 he stated with even more pride, "My library has increased in Monographs, & current works, having nearly all works there is any occasion to refer to" (P-G, October 1868). And indeed it had, for Pease's library, now incorporated into that of the Bishop Museum, included not only such standard works as Reeve's *Conchologia Iconica*, Sowerby's *Thesaurus Conchyliorum*, Philippi's *Abbildungen*, and Kiener's *Conographie des Coquilles Vivantes*, but also such rarities as the works of D'Argenville, Buonanni, Knorr, D'Avila, Favanne, and Seba.

Correspondence and Exchange

Pease was interested in more than just amassing a collection of mollusks: He wanted to interpret them, and to these studies he devoted "all the means at [his] disposal, every cent [he could] obtain, . . . on original researches and collections" (Pease-Nolan, ANSP). Through correspondence and exchange he became involved in numerous transactions with dealers and collectors throughout the world, a fact verified by a letter to Garrett in 1869: "I have posted myself up as to the names & addresses of all collectors throughout the world, & almost venture to say that no person living has more information than I have, regarding them" (P-G, October 1868).

An early correspondent was Philip Pearsall Carpenter (1819-1877), then resident in England, who was engaged by Pease to act as his agent. Carpenter received several parcels of shells from Pease in the 1850's, named specimens, sold various lots, and sponsored the publication of Pease's descriptions in the *Proceedings of the Zoological Society of London.* In the 1860's the association with Carpenter came to an end with bitter recriminations from both parties flung by letters across two oceans and a continent. Pease recorded the end of the friendship with terse comments to Garrett: "It is fortunate that I am clear of him" (P-G, January 1864); "I think he has treated me cruelly" (P-G, May 1866).

By 1858 Pease was in communication with other English dealers and collectors. He recorded a number of transactions with Robert Damon, the well known Weymouth dealer (P-G, September 1858; November 1858), and he wrote to Garrett of receiving parcels and letters from Sylvanus Hanley (P-G, June 1860) and Henry Adams (P-G, February 1868). From the latter he received "fifty or more of his Japanese shells" (P-G, February 1868). Another of Pease's English correspondents was J. E. Gray, then Keeper of Zoology at the British Museum (Natural History), to whom he sent not only cowries that Gray described (Gray, 1858), but also specimens of bats (Gray, 1862a) and planarians (Gray, 1860).

Chief of Pease's English correspondents was Hugh Cuming (1791-1865), the Englishman whose prolific collections form the basis for much of nineteenth-century conchology. Pease first communicated with Cuming in 1859, sending specimens that were incorporated into the Cuming collection in London. Cuming was by that time an old man, and Pease's comments to Garrett reflect both Cuming's decline and the status of conchology in England.

> *April 1861:* "I have rec'd . . . a letter from Mr. Cuming, in which he excuses himself from not having written a long time for reason of sickness. I fear from the tenor of his letter, that the old gentleman is near his end."

> *June 1862:* "I have not heard from Mr. Cuming since you left. I fear the old man is beyond doing anything."
>
> *September 1862:* "Nothing as yet from Cuming, though I learn from other parties that he is at work on a box for me. His memory is becoming poor & he is failing, not able to work much in his collection."
>
> *January 1864:* "In regards to Cumings [sic] I learn that his infirmities are increasing on him & that almost all are excluded from his collections, by reason of quarrelling with them. In fact he has become like a dog in the manger, his own work cannot be depended on & he is not willing to allow others to work."
>
> *May 1866:* "Death has made sad havoc among conchologists the past year. Cumings [sic], Reeve, Woodward, & Denison in London, Bernardi at Paris, all died within a few months of each other. . . . Cumings collection has been bequeathed to the British Museum in case Parliament will make a grant to meet his wishes. For the present it is locked up. Adams is his conchological executor. . . . I learn . . . that the 'Con Iconica' will be united to 'Thes Con' & carried on by Sowerby. But little will be done in Conchology at London & nothing scarcely has been done the past two years."

With the passing years Pease's correspondents were to be found in all parts of the world. His German correspondents included Graeffe (P-G, February 1868); Dunker, who "furnished me a number of his types" (P-G, February 1868); and Semper, who sent "a set of the land shells of the Pelew Islands [Palau Islands]" (P-G, March 10, 1871). Among Pease's French correspondents were Deshayes, from whom he had "a series of his types named by him" (P-G, March 10, 1871), and Crosse, who received and translated Pease's papers for the *Journal de Conchyliologie* (Crosse, 1871). Pease was also in correspondence with Cox (P-G, October 1868) and Brazier in Australia. It was Brazier who wrote "to give honour to whom honour is due as I had every respect for the late William Harper Pease as a jolly good fellow" (Brazier, 1889). American correspondents included Isaac Lea (Pease-Lea, ANSP); G. W. Tryon, Jr. (Pease-Tryon, ANSP); Thomas Bland (Pease-Bland, ANSP); and R. E. C. Stearns, who "sent me a number of the small species I wanted" [from the West Coast of the U.S.] (P-G, February 1868).

The activities and interests of conchologists throughout the world are recorded in the Pease-Garrett letters:

> *June 1862:* "The French are describing many new species from New Caledonia. Gould is not through yet with the Rogers [sic] Expedn.[6] I notice Dohrn has described a number of species from Tahiti."

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[6] The "Rogers" Expedition was the North Pacific Exploring Expedition under the command of Captain Ringgold and later Captain Rodgers (Johnson, 1964).

> *February 1868:* "Little is doing in London as to Conchology. Crosse at Paris is publishing species from Cochin China & other French colonies. Those from New Caledonia are about running out. Montrouzier I hear has returned to Europe. A complete catalogue of Medit marine species has been published. In the U. S. they are more active. A conchological section has been formed in the Academy at Philad & Tryon has turned over his Coll & library to it. Their Colln now comprises over 20,000 species. I am about the only one however, publishing much in their Journal on Tropical forms. They have commenced publishing in cheap form, monographs of all genera of shells without figures, to be completed in five years. . . . In California, the Academy appears to be going ahead. They are increasing in numbers, though they do but little in Conchology. The principal one is Stearns, he has been collecting on the Coast. . . . Dr. Newcomb is doing more than formerly in marine species."
>
> *October 1868:* "I hear that Cumings collection is being mounted in the British Museum by Mrs. Gray & will be ruined. Since Reeve & Cumings death, but little has been done, in England, in Conchology."
>
> *April 1870:* "In Paris, they continue to describe land and marine shells from New Caledonia. The Italian magazine is devoted to the Medit. species & the land shells of Southern Europe. The Spaniards are also waking up; they have a scientific expedition examining So. America from the Pacific to the Atlantic over the Andes, through Peru & Chile."
>
> *March 10, 1871:* "Collecting is going on extensively all over the Tropics. . . . The gentlemen connected with the Geological Survey of India are collecting extensively at Ceylon, Mauritius, Seychelles & Andaman Islands & also along the Indian coast. They commenced their descriptions with Adams in London, but last year they broke off & are publishing in Calcutta. I have the preference of their new species, for the reason that they are finding a number of our small marine species there. . . . There has been published also an exhaustive work in two vols on the Mediterranean & one also on the Red Sea."

Numerous catalogues and references indicate that the specimens Pease collected in the Hawaiian Islands and obtained from other islands in the Pacific were spread throughout the world (Paetel, 1873, 1887; Rigacci and Rigacci, 1874). He also sent at least two rather extensive collections to Europe: In 1867 a collection was sent on loan to the Paris Exhibition, sponsored by the Paris Geographical Society (Martin, HSA); a second collection, sent to Germany by Frick in 1871, was described by Martens and Langkavel in the *Donum Bismarckianum* (Martens and Langkavel, 1871).

Other Interests in Natural History

Pease's correspondents not only kept him abreast of the times in conchology but also stimulated his wider interests in natural history. The Pease-Garrett letters again demonstrate that, despite his physical isolation from centers of academic activity, Pease was acutely aware of developments and activities in all of the natural sciences, albeit his opinions were somewhat other than they might have been had he been in one of the centers.

Of Darwin, Pease wrote the following to Garrett: "Darwin's ideas on the origin of species, appears to be absorbing all the attention. . . . Agassiz . . . comes down strong on Darwin. In fact so near as I can learn, Darwin has but few backers" (P-G, September 1860).

Of Louis Agassiz, one of America's foremost naturalists of the nineteenth century and founder of the Museum of Comparative Zoology at Harvard University, Pease was patently disapproving. In March 1865 he wrote that "two young men, pupils of Agassiz have arrived here sent out for the purpose of examining the Nat History of the Sandwich Islands. . . . So far their collections have been mostly on Botany & insects —only a few shells. They will not interfere with me much." In 1866 he commented that "Agassiz has been in Brazil for some time. . . . I learn from Boston, that his great school, is about used up. Funds have failed, students left & only two or three paid assistants at work. . . . Like all of his great works, it will fail & he will never carry it out. The building is a grave for the immense collections made" (P-G, January 1866). Two years later Pease wrote, "Agassiz is on his way to California. I hear that his income is reduced quite low, & that his great school is nearly dispersed. He never completes anything. Even his Brazilian collection will never be studied out" (P-G, October 1868). It is ironic that only four years were to elapse before Agassiz himself directed a portion of the Pease collection be purchased for the Museum of Comparative Zoology at Harvard, following Pease's death.

Apart from his study of mollusks, Pease's own work in natural history was limited. His first published paper, which was on the geology and natural history of Mexico (Pease, 1848), and the essays on science and geology, which he read at the meetings of the Royal Hawaiian Agricultural Society (Pease, 1850, 1852) have already been mentioned. In his first letter to Garrett he wrote of being "at present engaged on Crustacea" (P-G, March 1857), and in April of the same year he gave Garrett extensive instructions for cleaning corals but noted, "I cannot pay much attention to them at present" (P-G, April 1857). In the *Proceedings of the Zoological Society of London*, there are several references by Gray to specimens of birds, bats, and polyclads sent him by Pease

(Gray, 1858, 1860, 1862a, 1862b), and Pease wrote of sending Gray some fish that Garrett had collected (P-G, January 1861). His interest in plants was encouraged by Hillebrand, and there are numerous instructions to Garrett to collect seeds and cuttings of plants on islands in the Central Pacific. His interest in geology is reflected in a brief note in the *Proceedings of the California Academy of Sciences* titled "On the Existence of an Atoll Near the West Coast of America and Proof of Its Elevation" (Pease, 1868). Two articles dealing with bibliographic references to the Hawaiian Islands indicate his concern for the history of natural history (Pease, 1862a, 1862b).

Molluscan Studies

Pease's collection of shells, the comparative material he received by exchange, the library he accumulated over the years, and the correspondence he carried on formed the basis for his molluscan studies, the tangible results of which are the species he described between 1860 and 1872. His first publications in the *Proceedings of the Zoological Society of London* were somewhat sketchy, consisting merely of brief descriptions of shells without either dimensions or figures. With experience his descriptions became more complete; in all, 20 papers appeared in the *Proceedings* through 1865, when he broke off with "the London people" because of his argument with Carpenter (P-G, May 1866). After 1865 his papers appeared in the *American Journal of Conchology* and the *Journal de Conchyliologie* in Paris, but he returned again to the Zoological Society of London for publication between 1869 and 1871, sending the Londoners his descriptions of marine shells and the Paris conchologists his descriptions of land shells (P-G, April 1870).

In 1866 Pease entreated Garrett to return to Honolulu "that we may enjoy the fruits of our labors" (P-G, January 1866). The fruits were to be of a much broader and more speculative nature than his published works would indicate. In 1861 he had discussed with Garrett "A Catalogue of Pacific Shells on a Large Scale," for which he sent to the West Coast for a specially ruled book (P-G, April 1861). In 1868 he talked of " 'A Monograph of the Pleurotomidae,' of which I find over 700 species have been described" (P-G, October 1868), and of "writing out the Marine Gasteropodae of the Sandwich Islands, which I propose to publish as soon as fifty subscribers are obtained at $20 each. . . . It will be introduced by a general essay on Polynesia in general" (P-G, October 1868). The French conchologists Crosse and Fischer stated that Pease had planned "deux grands ouvrages, l'un sur la Faune Malacologique de la Polynesie, et l'autre sur les Mollusques Terrestrial et Fluviatiles des iles Hawaii" (Crosse and Fischer, 1873). The only evidence for these works lies in the "ruled notebook" and two other manuscript volumes now in the Bishop Museum, in which are lists of species, localities, notes on synonymy, and fragments of essays.

What would perhaps have been Pease's greatest contribution to the study of the Mollusca of the Pacific is reported in a brief, almost forgotten paragraph in the *Reports of the British Association for the Advancement of Science* for 1864. The article, "On the Principal Divisions of the Pacific Fauna" is a résumé of a five-page essay sent by Pease to P. P. Carpenter, who noted on the essay, "I read this at the Newcastle meetings" (Pease ms, BPBM). The article summarizes the geology of the Pacific basin and the distribution of both land and marine species; it proposes that the Pacific be divided into different provinces for land and marine species and suggests that the distribution of land and marine forms is based on different principles. The essay goes into the observations and theories in detail. Article and essay are provocative and perspicacious introductions to the now-recognized principles of zoogeography of the Pacific—principles that emerged through the work of others in the 1890's.

The dreams failed to materialize; Garrett was too busy and too engrossed in his work to return to Honolulu; Pease was in failing health. A glimmer of recognition of his achievements and competence came in 1871 when the American Minister to the Hawaiian Kingdom asked if Pease would accompany the American Surveying Expedition to the West (P-G, March 1871). But the invitation came too late. Hillebrand had diagnosed a "bronchial affection" (P-G, March 1871), and the end came in June 1871, when Pease died at his home in Honolulu.

Personal Life and Family

The Pease-Garrett letters mirror in copperplate hand not only Pease's scientific interests but also his concern for and knowledge of politics and economics, his sense of humor, and his family life.

Pease apparently broke his ties with the United States completely when he became a resident of the Hawaiian Islands in 1850, commenting to Garrett, "Your hold on home is being fast loosened and broken off, the same as mine. My interest there is entirely gone" (P-G, March 1865). Nevertheless, he retained a deep concern for affairs in the United States and kept up with those in other parts of the world, reporting faithfully to the traveling Garrett, who did not have such ready access to news.

Pease seemed to be much preoccupied by the Civil War, describing his feelings to Garrett on several occasions:

> *January 1861:* "Affairs at home look gloomy, though it is the opinion of those best informed that a compromise will

> eventually settle the trouble & no dissolution or permanent one will take place. But the distress arising from the present state of affairs there, is really painful."
>
> *September 1862:* "You will see by the papers, blood is flowing freely in the U. S. No one dares predict the end, but it is not yet & in my humble opinion it is a long way off."
>
> *January 1864:* "The news from the U. S. is favorable to the North though it is slow & tedious war. It is generally supposed that Lincoln will be the next President. The whole North is Abolition and Slavery is doomed."

Of European affairs Pease commented, "It looks war-like in Europe. We have read the speech of Napoleon [Napoleon III] at the opening of the French Parliament and it is bold, saucy and full of war. He says that the great treaty of 1815 is broken and he shall not regard it as binding any more" (P-G, January 1864).

Honolulu's economic and political fortunes during the 1860's were also reported to Garrett:

> *January 1861:* "Great changes have taken place. . . . Honolulu is down flat, one half the whalers have gone home & none are coming out, consequently a number of our merchants are leaving for California & home. Those that remain, are connecting themselves more or less with agriculture, sugar growing, etc. etc. It will require several years to bring back the business to us. But when we do begin to advance, it will be on a solid basis."
>
> *June 1862:* "Quite a revolution has taken place on our Islands the past year in consequence of the falling off, of the whaling fleet. Every body is going into agricultural business, either sugar or rice. There are now seven sugar plantations in the Hilo District, one in Honolulu, and one in Lahaina."
>
> *September 1862:* "Changes are taking place, every one busy at some branch of agriculture. Rice is now being grown to a large extent particularly about Honolulu. The last vessel to the coast took over more than 100 tons. The young prince [Prince Albert, son of Kamehameha IV and Queen Emma] is very sick & cannot live, he may die before the vessel sails."
>
> *January 1864:* "Great changes. . . . The King [Kamehameha IV] died very suddenly & Prince Lot is now King. Goodale resigned his office & is going to America."
>
> *October 1868:* "Everything moves on in the same old, quiet, slow pace, but little or no change. We have now regular steam communication with San Francisco, every three weeks; the sailing vessels are consequently run off with the exception of two."

Serious in most of his writing, Pease's sense of humor glimmered through his reports to Garrett: "Wishing you all success & gallons of oil & bags of coffee, not forgetting the boxes of shells" (P-G, June 1862); "I had long ago given you up & never expected to hear from you again, supposing that some hungry kanaka had gnawed up your bones" (P-G, March 10, 1871); and he hoped that Garrett might "be uneaten and in good health" (P-G, April 1869). Of his "fat little daughter" Pease wrote, "The little one talks a number of languages, none of which I understand as yet" (P-G, March 1865); "Our little girl is growing and troubles me in my collections, by assorting my duplicates and arranging them in boxes" (P-G, May 1866); and "My little girl is just seven years old and I almost fancy myself a grandfather" (P-G, October 1868).

Neither photograph nor portrait of Pease has been found, but Lady Franklin,[7] who met Pease while she was visiting on the Kauai plantation of Robert C. Wyllie,[8] wrote, "I find it so difficult to make out what he says that much is lost to me—this proceeds partly perhaps from a want of some teeth in front of his mouth, but chiefly from his holding and chewing tobacco which not only thickens his speech, but causes him to be constantly spitting" (Korn, 1958).

Pease married twice in the Hawaiian Islands. According to Lady Franklin, Nelly, his first wife, was part-Hawaiian and a Roman Catholic, "brought up in the strictest way by nuns" (Korn, 1958). (Pease himself was "a strong Episcopalian" [Lady Franklin *in* Korn, 1958]). Nelly died in June 1860 (P-G, June 1860); and their son, W. H. Pease, Jr., died in 1861 (P-G, March 1861). He married again in 1861, writing Garrett, "An affair has happened which has interfered somewhat with my studies. I have been married & am once more settled down" (P-G, January 1861). He was survived by his widow, Sophia Clapp Pease, and by their daughter, Emmeline Harper Pease, who was born in November 1861. Mrs. Pease later remarried—first, William H. Feary and, later, David L. Kahaleaahu. She died in 1920. Emmeline Harper Pease married Henry Kaia, by whom she had one child, and, later James A. Thompson.[9] She died in 1933.

Present Status of the Pease Collection and Library

Following Pease's death in Honolulu in June 1871, the *Pacific Commercial Advertiser* noted that "the late Mr. H. Pease was the owner of a large and valuable collection of rare books, and also a cabinet of curiosities"; the editor expressed the hope that the Hawaiian government would purchase both. The "cabinet of curiosities" is now in the Museum of Comparative Zoology at Harvard University; most of the books are in the Bishop Museum, Honolulu.

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[7] Lady Franklin was the widow of Admiral Sir John Franklin, the renowned Arctic explorer; she spent two months in the Hawaiian Islands, arriving on April 9, 1861, and sailing on June 25, 1861.

[8] Robert Crichton Wyllie, Kamehameha IV's minister of foreign relations, was a Scotsman who owned Princeville Plantation in Hanalei Valley, Kauai.

[9] James A. Thompson was clerk of the Supreme Court and collected land shells as a hobby.

When the estate was settled, the Pease collection was sent to Boston to be sold "entire." In Boston it was offered to Mrs. Witthaus of New York by J. O. A. Johnson for $3000 on September 30, 1872 (Witthaus letter to J. G. Anthony, MCZ). Mrs. Witthaus noted that she had seen the collection in the U. S. Appraiser's Office in Boston and found it damaged by careless packing. She was able to arrange to purchase only such specimens as she wanted, and the shells that she had selected later became the property of Vassar College. The remainder of the Pease collection was bought for the Museum of Comparative Zoology by Louis Agassiz in 1872.

In 1944 Dr. W. J. Clench was invited by Vassar to evaluate several collections of mollusks then housed in the basement of Avery Hall. He found Mrs. Witthaus's selected series of Pease specimens, and they were given to the Museum of Comparative Zoology. Thus, after a period of some 70 years, the two parts of the Pease collection were again united.

The Pease Library was inventoried as "1000 books and pamphlets #1400" at the time of Pease's death. The library remained in the Hawaiian Islands, where it was purchased by the Hawaiian Government for $700.00. Later, much of it was obtained by the Bishop Museum, where many of Pease's volumes may now be identified by the gold letters *W. H. P.* on the spines of the books.

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PART II

CATALOGUE OF SPECIES AND BIBLIOGRAPHY OF WILLIAM HARPER PEASE

by W. J. Clench*

The following list of scientific names and titles is complete, so far as can be traced, for the work done by W. H. Pease.

A great many of the types of Pease's species are in the Pease collection in the Museum of Comparative Zoology, Harvard University; others are in the British Museum (Natural History) and in the Academy of Natural Sciences of Philadelphia.

Although Pease failed to give type localities for many of his species, specific localities, at least to islands, can be found for many of his terrestrial species by referring to his paper (PZS, [1871] 1872:472–477). Type localities in the following list are given only when Pease gave them in the original or in subsequent descriptions. His localities in the 1872 paper are in all probability the type localities. Present-day names for localities appear at the end of the list.

Pease placed a question mark (?) before a genus to indicate that he was not certain as to just what genus his species should belong. A generic name in parentheses in a second citation indicates that he had changed the generic position at a later date. Under the generic names introduced by Pease, the lack of a type species indicates that Pease did not name one. Type species, however, have been listed for his monotypic genera.

Abbreviations

For the sake of brevity, the following letter abbreviations are used for journal titles in the catalogue that follows:

AJC—American Journal of Conchology
JC—Journal de Conchyliologie
PZS—Proceedings of the Zoological Society of London

Titles of other journals cited in the catalogue will be obvious from the shortened form of the full title.

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A CATALOGUE OF NAMES INTRODUCED BY PEASE IN THE PHYLUM MOLLUSCA

abbreviata, Partula 1864 [1865], PZS, p. 675 [nomen nudum].

abbreviata, Planaxis 1865, PZS, p. 515; 1868, AJC, 4:101, pl. 12, fig. 16 (Tahiti).

abbreviata, Realia 1864 [1865], PZS, p. 674; 1869, JC, **17**:155, pl. 7, fig. 5 (*Omphalotropis*) (Tahiti).

acetabulum, Helix 1861, PZS, p. 242 (Tahiti).

aciculata, Eulima 1860 [?1861], PZS, p. 438 (Sandwich Islands).

aculeata, Scutellina 1868, AJC, 4:100 (Hawaii).

affine, Sistrum 1862 [1863], PZS, p. 244; 1868, AJC, 3:277, pl. 23, fig. 13 (Kingsmill Island).

affinis, Partula 1864 [1865], PZS, p. 675 [nomen nudum]; 1868, AJC, 3:224 (Tahiti).

affinis, Realia 1865, AJC, 1:288; 1866, AJC, 2:82, pl. 5, fig. 4; 1869, JC, **17**:152 (*Omphalotropis*) (Aitutake).

affinis, Triphoris 1860 [1861], PZS, p. 434 (Sandwich Islands).

alba, Thala 1868, AJC, 3:215, pl. 15, fig. 8 (Paumotus).

albinea, Helicina maugeriae 1871, PZS, p. 466 (Raiatea).

albocincta, Engina 1860, PZS, p. 142 (Sandwich Islands).

albomaculatus, Goniobranchus 1866, AJC, 2:204; 1871, AJC, 6:302, pl. 20, fig. 2a-c (Pacific Islands [probably Society Islands]).

albopustulosa, Doris 1860, PZS, p. 30 (Sandwich Islands).

alta, Helix 1868, AJC, 4:153, pl. 12, fig. 1 (Ponape Island).

alternata, Partula 1864 [1865], PZS, p. 675 [nomen nudum].

alternata, Triphoris 1860 [?1861], PZS, p. 434 (Sandwich Islands) [is *T. bicolor* Pease, new name for *T. alternata* Pease 1861; non C. B. Adams 1852].

ambigua, Limnaea 1870, AJC, 6:6, pl. 3, fig. 5 (Hawaiian Islands).

ambusta, Auriculella 1868, JC, **16**:345 (Hawaiian Islands).

analogica, Pithys 1870, JC, **18**:397; 1871, PZS, p. 454 (*Pitys*) (Marquesas Islands).

angasii, Rissoina 1871, AJC, 7:20 [new name for *turricula* Angas 1867; non *turricula* Pease 1860].

angicostata, Hindsia 1860, PZS, p. 142 (Sandwich Islands).

angiostoma, Cythara 1868, AJC, 4:105 [Pease apparently introduces *angiostoma* as a new name for *triticea* Kiener [in] Reeve 1843; non Kiener 1840. It is not stated to be a new name.]

angiostoma, Thala 1868, AJC, 3:216, pl. 15, fig. 9 (Paumotus).

angulata, Carelia adusta 1870, JC, **18**:403 (Kauai).
angulatus, Euchelus 1868, AJC, **3**:283, pl. 23, fig. 27 (Annaa Island).
annectens, Bulimus 1864 [1865], PZS, p. 671 (no locality given).
antiqua, Leptachatina 1870, JC, **18**:94 (Kauai).
aperta, Haminea 1868, AJC, **4**:72 (Tahiti).
aperta, Tornatellina 1864 [1865], PZS, p. 673 (Tahiti).
approximata, Nassa 1868, AJC, **3**:272, pl. 23, fig. 3 (Ascension Id.).
approximata, Turricula 1860, PZS, p. 146 (Sandwich Islands).
arborescens, Bornella 1871, AJC, **6**:302, pl. 20, fig. 3a-c (Tahiti).
areola, Aclesia 1860, PZS, p. 24 (Sandwich Islands).
argutus, Bulumus 1864 [1865], PZS, p. 670 (no locality given).
armata, Vertigo 1871, PZS, p. 461 (Bolabola Island).
armatus, ?Acanthochites 1872, AJC, **7**:195 (Oahu).
asperum, Cerithium 1860 [?1861], PZS, p. 433 (Sandwich Islands).
assimilis, Mitra 1868, AJC, **3**:211, pl. 15, fig. 1 (Polynesia).
assimilis, Partula 1868, AJC, **3**:230, pl. 15, figs. 28, 29 (Roratonga).
assimilis, Terebra 1869, AJC, **5**:67 (Oahu) [is *T. contigua* Pease, new name for *assimilis* Pease; non Angas 1867; 1871, AJC, **7**:20].
atiensis, Pitys 1871, PZS, p. 453 (Atiu Island).
atra, Planaxis 1869, AJC, **5**:72, pl. 8, fig. 4 (Marquesas).
Atropis 1871, PZS, p. 463 [No type species given and no species mentioned. In the list at the end of his paper, Pease lists several species under this subgenus.]
attenuata, Partula 1864 [1865], PZS, p. 672 (no locality given).
attenuatum, Cirsotrema 1860 [?1861], PZS, p. 400 (Sandwich Islands).
aurantium, Operculatum 1868, AJC, **3**:287 (Hawaii).
australis, Tritonidea 1871, AJC, **7**:21 (Australia) [new name for *T. assimilis* Angas 1867, PZS, p. 187; non *Buccinum assimilis* Reeve 1846].
bacca, Vertigo 1871, PZS, p. 462 (Kalapana, Puna District, Hawaii Island).
baetica, Lampania 'Pease' Paetel 1887, Catalog der Conchylien-Sammlung (Berlin) [nomen nudum].
balteata, Clathurella 1860, PZS, p. 143 (Sandwich Islands).
balteata, Leptachatina 1870, JC, **18**:91 (Kauai).
balteata, Nassa 1869, AJC, **5**:71, pl. 8, fig. 4 (Ebon Island).
balteata, Rissoina 1869, AJC, **5**:72 (Hawaii).
bella, Daphnella 1860, PZS, p. 147 (Sandwich Islands).
bella, Helicina 1864 [1865], PZS, p. 676 [nomen nudum].
bella, Turricula 1860, PZS, p. 145 (Sandwich Islands).
bellum, Pterogasteron 1860, PZS, p. 36 (Sandwich Islands).
biangulatum, Cyclostoma 1864 [1865], PZS, p. 674 (no locality given).
bicarinata, Amathina 1860 [?1861], PZS, p. 399 (Sandwich Islands).

bicarinata, Clathurella 1862 [1863], PZS, p. 243; 1868, AJC, 3:222, pl. 15, fig. 23 (Kingsmill Islands).

bicolor, Partula 1871, AJC, **7**:26, pl. 9, fig. 4 (Guam).

bicolor, Triphoris 1868, AJC, 4:127 [new name for *T. alternata* Pease 1860; non C. B. Adams 1852].

bifasciata, Borsonia 1860, PZS, p. 143 (Sandwich Islands).

bilineata, Partula 1864 [1865], PZS, p. 675 [nomen nudum]; 1866, AJC, 2:201; 1867, AJC, 3:81, pl. 1, fig. 10 (Society Islands).

bipes, Syphonota 1860, PZS, p. 23 (Sandwich Islands).

boeticum, Cerithium 1860 [?1861], PZS, p. 433 (Sandwich Islands).

brazieri, Helicina 1870, JC, **18**:397 (Niue Island).

brazieri, Partula 1871, AJC, **7**:27, pl. 9, fig. 5 (Tutuila).

brevicula, Leptachatina 1869, JC, **17**:169 (Kauai).

brevis, Cithara 1868, AJC, 3:217, pl. 15, fig. 11 (Paumotus).

brunnea, Avicula 1862 [1863], PZS, p. 244 (Sandwich Islands).

brunnea, Clathurella 1860, PZS, p. 143 (Sandwich Islands).

brunnea, Strigatella 1868, AJC, 3:215, pl. 15, fig. 7 (Polynesia).

brunneus, Triphoris 1870 [1871], PZS, p. 777 (Apaiang Island).

buccinoides, Clathurella 1860, PZS, p. 144 (Sandwich Islands).

calliostoma, Helicina 1871, PZS, p. 466 (Marquesas Islands).

canaliculata, Clathurella 1868, AJC, 3:219, pl. 15, fig. 17 (Paumotus).

cancellata, Coralliobia 1860, PZS, p. 399 (Sandwich Islands).

cancellata, Scutellina 1860 [?1861], PZS, p. 437 (Sandwich Islands).

cancellatus, Strombus 1860, PZS, p. 398 (Sandwich Islands).

candida, ?Collonia 1860 [?1861], PZS, p. 436 (Sandwich Islands).

candida, Cypraea 1865, PZS, p. 515; 1868, AJC, 4:95, pl. 11, figs. 12, 13 (Apaiang Island [1868]).

candida, Volvatella 1868, AJC, 4:73, pl. 7, fig. 6 (Polynesia).

capillata, Helix 1866, AJC, **2**:292 (Sandwich Islands).

Catinella 1870, JC, **18**:97; 1871, PZS, p. 459 [used as a genus in 1870 but neither indicated as new nor described as such until 1871; type species, *C. rubida* Pease].

celsa, Endodonta 1871, PZS, p. 455 (Raiatea) [see *Pithys celsa* Pease].

celsa, ?Pithys 1870, JC, **18**:396 (Raiatea) [redescribed as *Endodonta celsa*].

cerithiopsis, Rissoina 1862, JC, **10**:382 [nomen nudum].

Chondrella 1871, PZS, p. 465 [type species, *Cyclostoma parvum* Pease].

cincta, Helicina 1864 [1865], PZS, p. 676 [nomen nudum].

cinctus, Melampus 1864 [1865], PZS, p. 676 [nomen nudum].

cinerea, Littorina 1869, AJC, **5**:78, pl. 8, fig. 14 (Marquesas).

cinerosa, Doris 1871, AJC, **7**:13, pl. 5, fig. 1 (Huaheine).

cingulifera, Triphoris 1860 [?1861], PZS, p. 434 (Sandwich Islands).

Citharopsis 1868, AJC, 4:97 [no type species given].

citrina, Partula 1864 [1865], PZS, p. 675 [nomen nudum]; 1866, AJC, 2:195 (Raiatea).

clara, Partula 1864 [1865], PZS, p. 671 (no locality given).

clathrata, Emarginula 1862 [1863], PZS, p. 241; 1868, AJC, 4:99, pl. 11, fig. 24 (Howland Island [1868]).

clavata, Triphoris 1860 [?1861], PZS, p. 434 (Sandwich Islands).

cognata, Partula 1864 [1865], PZS, p. 675 [nomen nudum].

colorata, Helicina 1868, AJC, 4:156, pl. 12, fig. 9 (Annaa Island).

compacta, Labiella 1869, JC, **17**:172 (Maui Island).

compacta, Limnaea 1870, AJC, **6**:6, pl. 3, fig. 4 (Oahu).

compacta, Partula 1864 [1865], PZS, p. 675 [nomen nudum]; 1866, AJC, 2:200; 1867, AJC, 3:81, pl. 1, fig. 9 (Society Islands).

complanatum, Registoma 1860 [?1861], PZS, p. 440 (Ebon Island, Marshall Group).

compressa, Scutellina 1868, AJC, 4:99, pl. 11, figs. 25, 27 (Tahiti).

compta, Cypraea 1860, PZS, p. 189 (Jarvis Island).

compta, Doris 1871, AJC, **7**:12, pl. 4, fig. 1 (Apaiang).

compta, Partulina 1869, JC, **17**:175 (Molokai).

concinna, Partula 1872, AJC, **7**:196 (New Hebrides).

concinna, Truncatella 1871, PZS, p. 468 (Apaiang).

congrua, Helix 1868, AJC, 4:154, pl. 12, figs. 3, 4 (Ponape Island) [is *Trochomorpha contigua* Pease, new name for *congrua* Pease 1868; non Pfeiffer 1858].

conica, Laimodonta 1862 [1863], PZS, p. 242; 1868, AJC, 4:101, pl. 12, fig. 15; 1871, JC, **19**:94 (Paumotus [1868]; Annaa [1871]).

conica, Torinia 1865, PZS, p. 514 (no locality given).

conoidalis, Tectura 1868, AJC, 4:98, pl. 11, fig. 22 (Roratonga Island).

conoidalis, Trochus 1868, AJC, 3:287, pl. 24, fig. 8 (Paumotus).

consimilis, Helix 1864 [1865], PZS, p. 675 [nomen nudum]; 1868, AJC, 3:227 (Tahiti).

conspersa, Bulla 1869, AJC, **5**:72, pl. 8, fig. 9 (Marquesas).

contigua, Melania 1870, AJC, **6**:7 (Kauai).

contigua, Terebra 1871, AJC, **7**:20 [new name for *T. assimilis* Pease 1869; non Angas 1867].

contigua, Trochomorpha 1871, PZS, p. 457 [new name for *Helix congrua* Pease 1868; non Pfeiffer 1858].

conula, Helix 1861, PZS, p. 243 (Tahiti).

coreensis, Turcica 1860, PZS, p. 189 (Corea Sea [Korea]).

corrugata, Borsonia 'Pease' Tryon 1884, Manual of Conchology, (1) **6**:228 [nomen nudum].

corrugata, Helicina 1864 [1865], PZS, p. 673 (no locality given).

corrugata, Trivia 1868, AJC, 4:95, pl. 11, figs. 14, 15 (Paumotus).

corrugatus, Euchelus 1860 [?1861], PZS, p. 435 (Sandwich Islands).

costata, Engina 1860, PZS, p. 142 (Sandwich Islands).

costata, Hydrocaena 1864, PZS, p. 676 [nomen nudum].

costata, Leptothyra 1869, AJC, 5:70 (Maui).

costata, Realia 1868, AJC, 3:225; 1869, JC, **17**:158, pl. 7, fig. 2 (*Scalinella*) (Tahaa).

costata, Vertigo 1871, PZS, p. 461 (Hawaii Island).

costatus, Triphoris 1870 [1871], PZS, p. 775 (Annaa Island).

costellifera, Anachis 1862 [1863], PZS, p. 279 (no locality given).

costellifera, Terebra 1869, AJC, 5:66 (Oahu).

costellifera, Truncatella 1871, PZS, p. 468 (Vavau Island).

costulata, Rissoina 1868, AJC, 3:295, pl. 24, fig. 28 (Paumotus).

costulosa, Atys 1869, AJC, 5:73 (Oahu).

costulosa, Leptachatina 1870, JC, **18**:90 (Kauai).

costulosa, Succinea 1864 [1865], PZS, p. 677 (Tahitian Archipelago, Society Islands).

costulosa, Vertigo 1871, PZS, p. 462 (Hawaii Island).

coxi, Bulimus (?Borus) 1872, AJC, 7:197 (Solomon Islands); Clench 1932, Nautilus, **46**:69 (*Diplomorpha*) (New Hebrides).

crassa, Partula 1864 [1865], PZS, p. 675 [nomen nudum].

crassicostata, Borsonia 1860, PZS, p. 143 (Sandwich Islands).

crassilabris, Partula 1864 [1865], PZS, p. 675 [nomen nudum]; 1866, AJC, 2:199; 1867, AJC, 3:81, pl. 1, fig. 6, as *crassilabrum* (Raiatea [1866, p. 201]).

crassilabrum, Partula 1867 [err. typ. for *crassilabris*, q.v.].

crenulata, Daphnella 1868, AJC, 3:221, pl. 15, fig. 20 (Polynesia).

crenulata, Scalaria 1868, AJC, 3:290, pl. 24, fig. 13 (Tahiti).

crispata, Scalaria 1868, AJC, 3:289, pl. 24, fig. 12 (Paumotus).

crocata, Haminea 1860, PZS, pp. 19, 432 (Sandwich Islands).

curta, Daphnella 1868, AJC, 3:221, pl. 15, fig. 22 (Paumotus).

Cyclomorpha 1871, PZS, p. 464 [type species, *Cyclostoma flavum* Broderip, monotypic].

cylindracea, Marginella 1868, AJC, 3:280 [err. typ. for *cylindrica*, q.v.].

cylindraceum, Cerithium 1869, AJC, 5:77 (Paumotus).

cylindrata, Leptachatina 1869, JC, **17**:168 (Kauai Island).

cylindrica, Clathurella 1860, PZS, p. 143 (Sandwich Islands).

cylindrica, Marginella 1862 [1863], PZS, p. 244 (Kingsmill Islands). [This species as *cylindracea* is given as a synonym of *M. polita* Pease (1868, AJC, 3:280). No reasons are given by Pease for this change.]

cylindrica, Truncatella 1864 [1865], PZS, p. 676 [nomen nudum].

cylindricus, Cryptophthalmus 1861, PZS, p. 245; 1868, AJC, 4:74, pl. 7, fig. 7 (Tahiti).

cylindricus, Triphorus 1870 [1871], PZS, p. 776 (Apaiang Island).

cylindricus, Triton 1868, AJC, 4:94, pl. 11, fig. 9 (Tahiti).

cytharoides, Columbella 'Pease' Pace 1902, Proc. Malac. Soc. London, 5:74 [nomen nudum].

deadalea, Cithara [Cythara] 1868, AJC, 3:218, pl. 15, fig. 13 (Paumotus) [see *C. debilis* Pease].

debilis, Atys 1860, PZS, p. 20 (Sandwich Islands).

debilis, Cythara 1868, AJC, 4:105 [new name for *C. deadalea* Pease 1868; non Reeve 1846].

debilis, Doris 1871, AJC, 7:11, pl. 5, fig. 2 (Huaheine).

debilis, Marginella 1871, AJC, 7:22 [new name for *M. oryza* Pease 1860; non Lamarck 1822].

debilis, Odostomia 1868, AJC, 3:292, pl. 24, fig. 21 (Howland Island).

decora, Doris 1860, PZS, p. 29 (Sandwich Islands).

decussata, Cithara [Cythara] 1868, AJC, 3:217, pl. 15, fig. 10 (Paumotus).

decussata, Scalaria 1868, AJC, 3:289, pl. 24, fig. 10 (Hawaii Island).

decussata, Turbonilla 1860 [?1861], PZS, p. 438 (Sandwich Islands).

decussatula, Helix 1866, AJC, 2:291 (Sandwich Islands).

deformis, Stylifer 1868, AJC, 3:293, pl. 24, fig. 23 (Paumotus).

delicata, Narica 1868, AJC, 3:282, pl. 23, fig. 25 (Paumotus).

delicatus, Pleurobranchus 1861, PZS, p. 245; 1868, AJC, 4:79, pl. 9, fig. 1 (Huaheine [1868]).

dentata, Tornatellina 1871, PZS, p. 460 (Hawaii Island).

dentifera, Vertigo 1871, PZS, p. 462 (Roratonga).

Dentiora 1862 [1863], PZS, p. 240 [type species, *D. rubida* Pease, monotypic].

depressa, Siphonaria 1862 [1863], PZS, p. 279; 1868, AJC, 4:98, pl. 11, fig. 23 (Apaiang Island [1868]).

depressiformis, Helix 1864 [1865], PZS, p. 670 (no locality given).

depressiformis, Vitrina 1864 [1865], PZS, p. 675 [nomen nudum].

deshayesii, Neritina 1868, AJC, 4:130 [new name for *N. sandwichensis* Deshayes 1838; non Philippi 1843] [This new name will, of course, have to apply to the name given by Philippi as it is five years later.]

Diadema 1868, AJC, 4:157 [no type species given].

discoidea, Helicina 1864 [1865], PZS, p. 676 [nomen nudum]; 1868, AJC, 3:226 (Tahaa).

discoidea, Torinia 1868, AJC, 4:102, pl. 12, fig. 18 (Paumotus).

dispar, Neritina 1868, AJC, 3:285, pl. 24, fig. 3 (Roratonga).

distans, Helix 1866, AJC, 2:290 (Sandwich Islands).

distorta, Leiostraca 1860 [?1861], PZS, p. 438 (Sandwich Islands).

Doriopsis 1860, PZS, p. 32; 1871, AJC, 6:299 [type species, *D. granulosa* Pease, monotypic].

dubia, Partula affinis 1864 [1865], PZS, p. 675 [nomen nudum].

Eburnella 1869 [1870], PZS, p. 647 [no type species given].

echinata, Doris 1860, PZS, p. 27 (Sandwich Islands).

elegans, Clathurella 1860, PZS, p. 144 (Sandwich Islands).

elongata, Hydrocaena 1864 [1865], PZS, p. 676 [nomen nudum].

elongata, Partula 1864 [1865], PZS, p. 676; 1866, AJC, **2**:196; 1867, AJC, **3**:81, pl. 1, fig. 2 (Moorea).

elongata, Realia 1868, AJC, **3**:225; 1869, JC, **17**:152, pl. 7, fig. 4 (*Omphalotropis*) (Raiatea).

elongata, Succinea 1870, JC, **18**:96 (Kauai).

elongata, Syphonota 1860, PZS, p. 24 (Sandwich Islands).

elongata, Turbonilla 1868, AJC, **3**:293, pl. 24, fig. 22 (Paumotus).

elongata, Volutella 1868, AJC, **3**:281, pl. 23, fig. 23 (Fanning Island).

erecta, Laminella 1869, JC, **17**:174 (Maui).

ericea, Mitra 1860, PZS, p. 146 (Sandwich Islands) [is *Mitra turgida* Reeve 1869, AJC, **5**:85].

exaratus, Rhizochilus 1860 [?1861], PZS, p. 399 (Sandwich Islands) [is a synonym of *Coralliophila deformis* Lamarck (Pease 1868, AJC, **4**:115)].

excavata, Doris 1860, PZS, p. 26 (Sandwich Islands) [is *D. oreosoma* Pease 1864; non *excavata* Stimpson 1855 (Pease 1863 [1864], PZS, p. 510)].

exilis, Clathurella 1860, PZS, p. 144 (Sandwich Islands).

exilis, Drillia 1868, AJC, **3**:220, pl. 15, fig. 19 (Tahiti).

exilis, Eulima 1862 [1863], PZS, p. 242; 1868, AJC, **3**:294, pl. 24, fig. 25 (Paumotus).

exilis, Trochus 1868, AJC, **3**:286, pl. 24, fig. 7 (Paumotus).

expansa, Auriculella 1868, JC, **16**:343, pl. 14, fig. 8 (Hawaiian Islands).

expansa, Partula 1871, AJC, **7**:26, pl. 9, fig. 3 (Tutuila).

extensa, Leptachatina 1870, JC, **18**:92 (Kauai).

faba, Helicina 1864 [1865], PZS, p. 676 [nomen nudum]; 1868, AJC, **3**:226 [nomen nudum] (neighboring island near Tahaa).

fabrifacta, Helix 1864 [1865], PZS, p. 669 (no locality given; Raiatia, on specimen label).

fasciata, Partula 1864 [1865], PZS, p. 675 [nomen nudum] (Marquesas); 1866, AJC, **2**:202 [is *P. ganymedes* Pfeiffer; c.f., note by Pease, AJC, **2**:293].

fasciata, Planaxis 1868, AJC, **4**:102, pl. 12, fig. 17 (Paumotus).

ficta, Helix 1864 [1865], p. 669 [Huaheine, on label in collection in the Mus. Comp. Zool. (Harvard)].

filicostata, Pitys 1871, PZS, p. 454 (Kauai).

fimbriatus, Euchelus 1860 [?1861], PZS, p. 435 (Sandwich Islands).

fischeri, Dolabrifera 'Pease' Paetel 1887, Catalog der Conchylien-Sammlung (Berlin), **1**:635 [nomen nudum].

flammea, Rissoa 1868, AJC, **3**:297, pl. 24, fig. 33 (Caroline Islands).

flammulata, Mitra 1868, AJC, **3**:212 (Sandwich and Paumotus).

flammulata, Triphoris 1860 [?1861], PZS, p. 434 (Sandwich Islands [Haena, Kauai]).

flavescens, Helicina 1868, AJC, **3**:228 (Mangaia) [is a synonym of *H. pacifica* Pease 1865; see note, 1871, PZS, p. 467].

foetida, Doris 1860, PZS, p. 31 (Sandwich Islands).

formosa, Cylindra 1868, AJC, **3**:271, pl. 23, fig. 1 (Ascension).

fortiplicata, Turricula (Costellaria) 1868, AJC, **3**:213, pl. 15, fig. 3 (Paumotus).

foveolatus, Murex 1869, AJC, **5**:83, pl. 8, fig. 3 (La Paz, Gulf of California).

fragilis, Hydrocena 1860 [?1861], PZS, p. 439; 1869, JC, **17**:145, pl. 7, fig. 6 (*Omphalotropis*) (Ebon Island, Marshall Group [Ponape on his original label]).

fragilis, Volvatella 1860, PZS, p. 20; 1868, AJC, **4**:73, pl. 7, fig. 4 (Sandwich Islands).

fratercula, Pitys 1871, PZS, p. 452 [nomen nudum] (Hervey Islands).

frivola, Helix 1866 AJC, **2**:290, pl. 21, fig. 3 (Oualan).

fucata, Scalaria 1860 [?1861], PZS, p. 400 (Sandwich Islands).

fucata, Triphoris 1860 [?1861], PZS, p. 433 (Sandwich Islands [Kauai]).

fucatum, Cerithium 1860 [?1861], PZS, p. 432 (Sandwich Islands).

fusca, Dolabrifera 1868, AJC, **4**:76, pl. 8, fig. 4 (Polynesia).

fusca, Partula 1864 [1865], PZS, p. 675 [nomen nudum]; 1866, AJC, **2**:193 (Raiatea).

fusca, Vitrina 1868, AJC, **4**:155, pl. 12, fig. 6 (Marquesas Islands).

fuscata, Helix 1864 [1865], PZS, p. 675 [nomen nudum].

fuscata, Trochomorpha 'Pease' Pilsbry 1896, Nautilus, **9**:120 (Ponape, Caroline Islands).

fuscescens, Doris 1871, AJC, **7**:14, pl. 4, fig. 3 (Maiao Island).

fuscescens, Strigatella 1860, PZS, p. 146 (Sandwich Islands).

fusco-lineata, Neptunea 1860, PZS, p. 189 (Corea Sea [Korea]).

fuscomaculata, Clathurella 1860, PZS, p. 144 (Sandwich Islands).

fusco-maculata, Cypraea 1865, PZS, p. 515; 1868, AJC, **4**:95, pl. 11, figs. 10, 11 (Apaian Island [1868]).

fusco-nigra, Vexilla 1860, PZS, p. 141 [note by Pease also including this species in the subgenus *Usilla*, 1868, AJC, **4**:115 (Sandwich Islands)].

fuscus, Melampus 'Philippi' Pease 1864 [1865], PZS, p. 676 [nomen nudum].

fusiformis, Columbella 1868, AJC, **4**:122 [new name for *C. pusilla* Pease 1862; non Sowerby 1844].

fusiformis, Conus 1860 [?1861], PZS, p. 398; 1868, AJC, 4:126 (Sandwich Islands) [is *C. parvus* Pease 1868; non *fusiformis* Pease 1861].

fusiformis, Engina 1865, PZS, p. 513; 1868, AJC, 3:273, pl. 23, fig. 5 (Howland Island).

fusiformis, Mitropsis 1868, AJC, 3:212, pl. 15, fig. 2 (Paumotus).

galba, Haminea 1860 [?1861], PZS, p. 432 (Sandwich Islands).

garrettii, Cythara 1860, PZS, p. 147 (Sandwich Islands) [see note, 1868, AJC, 4:105].

garrettii, Fossar 1868, AJC, 4:128 [new name for *Adeorbis costata* Garrett 1857; non Philippi 1844.] As neither Thiele nor Wenz mention *Fossar,* we add this note on the synonymy:

Fossarus Philippi

Fossar Gray 1840, Synopsis of the Contents of the British Museum, ed. 42, p. 151 [nomen nudum]; Gray 1847, Proc. Zool. Soc. London, p. 151 (type species, *Turbo ambiguus* Linnaeus, original designation).

Fossarus Philippi 1841, Archiv Naturgesch., **7**:42 (type species, *Fossarus adansoni* Philippi, monotypic).

Maravignia Aradas & Maggiore 1844 [in] Philippi, Enumeratio Molluscorum Siciliae (Berlin), **2**:224 (type species, *Maravignia sicula* Aradas & Maggiore, monotypic).

garrettii, Murex 1868, AJC, 4:103 [new name for *M. exiguus* Garrett 1857; non Broderip 1832].

garrettii, Partula 1864 [1865], PZS, p. 672 (no locality given).

gibbus, Latirus 1865, PZS, p. 54; 1868, AJC, 3:279, pl. 23, fig. 17 (Howland Island).

glabra, Mitra 1868, AJC, 3:272, pl. 23, fig. 2; 1869, AJC, 5:85 (Ascension) [is *M. lubrica* Pease 1869, new name for *M. glabra* Pease 1868; non Swainson 1821; Risso 1826].

globosa, Partula 1864 [1865], PZS, p. 675 [nomen nudum].

godeffroyana, Chromodoria 'Pease' Bergh 1891, Zoologische Jahrbücher, **6**:141 [not Pease, but Garrett].

Goniobranchus 1866, AJC, **2**:204 [type species, *G. reticulatus* Pease, here selected].

gracile, Cerithium 1860 [?1861], PZS, p. 432 (Sandwich Islands).

gracilis, Blauneria 1860, PZS, p. 145 (Sandwich Islands).

gracilis, Citharopsis 1868, AJC, 4:97, pl. 11, fig. 20 (Paumotus).

gracilis, Mucronalia 1868, AJC, 3:295, pl. 24, fig. 27 (Tahiti).

gracilis, Nassa 1868, AJC, 3:273, pl. 23, fig. 4 (Ascension).

gracilis, Odostomia 1868, AJC, 3:292, pl. 24, fig. 20 (Hawaii).

gracilis, Partula 1864 [1865], PZS, p. 675 [nomen nudum]; 1866, AJC, **2**:197; 1867, AJC, 3:81, pl. 1, fig. 3 (?Society Islands).

gracilis, Placobranchus 1871, AJC, **6**:303, pl. 21, fig. 1a, b (Tahiti).

gracilis, Rissoa 1860 [?1861], PZS, p. 438; 1862, JC, **10**:382 (*Rissoina*) (Sandwich Islands).

gracilis, Tornatellina 1871, PZS, p. 460 (Kauai).

gracilis, ?Triopa 1871, AJC, **6**:301, pl. 19, fig. 3a-d (Huaheine).

gracilis, Triphoris 1870 [1871], PZS, p. 774 (Kauai Island).

gracilis, Triphoris 1870 [1871], PZS, p. 777 (Kauai Island) [Both this species and the one preceding were described at the same time in the same publication. The two descriptions differ slightly. Only one lot under the above name is contained in the original collection of Pease. We have been unable to find any note by Pease correcting this error. Tryon (1872, AJC, **7**:206) introduced the name *T. peasei* for Pease's second *gracilis.*]

grandiflora, Doris 1860, PZS, p. 30 (Sandwich Islands) [is *D. grandifloriger* Abraham 1877; non *grandiflora* Rapp 1827].

grandis, Pleurobranchus 1868, AJC, 4:78, pl. 10, fig. 2 (Huaheine).

grandis, Syphonota 1860, PZS, p. 23 (Sandwich Islands).

granifera, Fissurella 1861, PZS, p. 244 (Sandwich Islands).

granifera, Narica 1869, AJC, **5**:78, pl. 8, fig. 13 (Jarvis Island).

graniferus, Vertagus 1860 [?1861], PZS, p. 433 (Sandwich Islands).

granocostata, Scutellina 1868, AJC, 4:100 (Hawaii).

granosus, Triphorus 1870 [1871], PZS, p. 776 (Tahiti).

granulata, Cypraea 1862 [1863], PZS, p. 278 (no locality given).

granulosa, Collonia 1868, AJC, 4:92, pl. 11, fig. 4 (Ponape).

granulosa, Doriopsis 1860, PZS, p. 32 (Sandwich Islands).

granulosa, Rissoina 1862, JC, **10**:382, pl. 13, fig. 10 (Sandwich Islands).

granulosus, Latirus 1868, AJC, 3:279, pl. 23, fig. 18 (Paumotus).

guppyi, Helicina 1871, PZS, p. 467 [new name for *H. humilis* Guppy 1868; non Rousseau 1854].

harpa, Clathurella 1860, PZS, p. 144 (Sandwich Islands).

hawaiiensis, Perna 1871, AJC, **7**:25 [new name for *P. californica* Conrad 1837. This name was proposed by Pease only because Conrad's species occurs in the Hawaiian Islands and not California. The name proposed by Pease is, of course, not valid.]

hawaiiensis, Tritonia 1860, PZS, p. 33 (Sandwich Islands).

Histiophorus 1860, PZS, p. 36 [type species, *H. maculatus,* monotypic].

hutchinsoni, Helicter 1862, PZS, p. 7 (Maui).

Hyalopsis 1871, AJC, **7**:27 [type species, *H. tumida,* monotypic].

imbricata, Vanikoro 1860 [?1861], PZS, p. 435 (Sandwich Islands).

imperforata, Partula 1864 [1865], PZS, p. 675 [nomen nudum].

imperforata, Pithys 1870, JC, **18**:394; 1871, PZS, p. 453 (*Pitys*) (Aitutake Island).

imperialis, Doris prismatica 1860, PZS, p. 32 as *Doris prismatica* var. *imperialis* (Sandwich Islands) [corrected (Pease 1863 [1864], PZS, p. 510; 1868, AJC, 4:132) to *Doriprismatica imperialis*].

incisa, Triphoris 1860 [?1861], PZS, p. 434 (Sandwich Islands).

inconspicua, Helicina 1864 [1865], PZS, p. 676 [nomen nudum].

inflexa, Eulima 1868, AJC, 3:294, pl. 24, fig. 26 (Paumotus).

inflexa, Terebra swainsonii 1869, AJC, **5**:64 [figured as *swainsonii* in the 1860 Conchologia Iconica, **12**, pl. 22, fig. 118 (Hawaiian Islands)].

inornata, Chromodoris 1871, AJC, **7**:18, pl. 8, fig. 3 (Huaheine).

interlirata, Neritopsis 1868, AJC, 3:282, pl. 23, fig. 26 (Annaa Island).

intermedius, Triton 1869, AJC, **5**:74 (Oahu).

interrupta, Daphnella 1860, PZS, p. 147 (Sandwich Islands).

kauaiensis, Melania 1870, AJC, **6**:7, pl. 3, fig. 6 (Kauai).

labiata, Partula 1864 [1865], PZS, p. 675 [nomen nudum].

labiata, Succinea 1864 [1865], PZS, p. 675 [nomen nudum]; 1868, AJC, 3:227 (Raiatea).

laevis, Gena 1868, AJC, 3:283, pl. 23, figs. 7, 28, 29 (Tahiti).

laevis, Lamellina 1864 [1865], PZS, p. 672 (no locality given).

laevis, Leptachatina 1870, JC, **18**:91 (Kauai).

laevis, Realia 1865, AJC, **1**:289; 1866, AJC, **2**:82, pl. 5, fig. 5; 1869, JC, **17**:145 (Ascension [1869]).

Lamellina 1860 [1861], PZS, p. 439 [type species, *L. serrata* Pease, monotypic; non Bory de Saint Vincent, 1826].

laminata, Helix 1866, AJC, **2**:292 (Sandwich Islands).

lateritia, Assiminea 'A. Adams' Pease 1869, JC, **17**:164 [nomen nudum].

lauta, Bullina 1860, PZS, p. 19 (Sandwich Islands).

lauta, Drillia 1868, AJC, 3:220, pl. 15, fig. 18 (Paumotus).

lauta, Terebra 1869, AJC, **5**:66 (Oahu).

lenta, Helix 1864 [1865], PZS, p. 675 [nomen nudum].

lenticulina, Helicina 1864 [1865], PZS, p. 676 [nomen nudum].

lentiginosa, Chromodoris 1871, AJC, **7**:18, pl. 9, fig. 1 (Huaheine).

liberatus, Capulus 1868, AJC, 3:285, pl. 24, fig. 2 (Paumotus).

Libratula 1865, PZS, p. 512 (no type species given).

lignaria, Partula 1864 [1865], PZS, p. 671 (no locality given).

lineata, Alcyna 1869, AJC, **5**:69 (Oahu).

lineata, Columbella 1860 [?1861], PZS, p. 399 (Sandwich Islands).

lineata, Doris prismatica 1860, PZS, p. 32 (Sandwich Islands) [corrected (Pease 1863 [1864], PZS, p. 510; 1868, AJC, 4:132) to *Doriprismatica lineata*].

lineolata, Partula 1864 [1865], PZS, p. 675 [nomen nudum]; 1868, AJC, 3:224 (Tahiti).

lirata, Pleurotoma 1869, AJC, **5**:68 (Oahu).

liratus, Latirus 1868, AJC, **4**:152 (Marquesas Islands) [based on *Latirus* (*Turbinella*) *gemmatus* var. Reeve, 1847, Conchologia Iconica, **4**:pl. 12, fig. 61].

Lobifera 1866, AJC, **2**:206 [This name is a synonym of *Polybranchia*. Pease changed the name as it was a "misnomer." However, according to the International Rules, this does not constitute a valid reason for changing a name.]

lubrica, Mitra 1869, AJC, **5**:85 [new name for *M. glabra* Pease 1868; non Swainson 1821; Risso 1826].

lucida, Assiminea 1869, JC, **17**:166, pl. 7, fig. 10 (Annaa Island).

lucida, Leptachatina 1870, JC, **18**:93 (Kauai).

lucidus, Melampus 1869, AJC, **5**:75 (Oahu; Annaa).

lugubris, Partula var.?, 1864 [1865], PZS, p. 672 (no locality given).

lutea, Borsonia 1860, PZS, p. 143 (Sandwich Islands).

luteostoma, Ranella 1860 [?1861], PZS, p. 397 (Sandwich Islands).

maculata, Engina lineata 1869, AJC, **5**:76, pl. 8, fig. 12 (Apaian).

maculata, Nerita 1868, AJC, **3**:286, pl. 24, fig. 6 (Tahiti).

maculatus, Histiophorus 1860, PZS, p. 36 (Sandwich Islands).

maculatus, Triphorus 1870 [1871], PZS, p. 777 (Kauai Island).

maculosa, Chromodoris 1871, AJC, **7**:16, pl. 7, fig. 2 (Tahiti).

maculosa, Clathurella 1862 [1863], PZS, p. 242; 1868, AJC, **3**:219, pl. 15, fig. 16 (Paumotus [1868]).

maculosa, Columbella 1871, AJC, **7**:22 [new name for *C. dermestoides* Angas 1867; non Sowerby 1844].

maculosa, Daphnella 1860, PZS, p. 148 (Sandwich Islands).

maculosus, Euchelus 1862 [1863], PZS, p. 243; 1868, AJC, **4**:91, pl. 11, fig. 1, as *Collonia maculosa* (Paumotus [1868]).

mammillata, Succinea 1871, PZS, p. 459 (Nukahiva).

marginata, Doris 1860, PZS, p. 30 (Sandwich Islands).

marginatus, Pleurobranchus 1860, PZS, p. 25 (Sandwich Islands).

marginatus, Pterogasteron 1871, AJC, **6**:304, pl. 21, fig. 3 (Huaheine).

marmorata, Purpura 1865, PZS, p. 515; 1868, AJC, **4**:92, pl. 11, fig. 5 (Apiana [1868]).

marmoratus, Triforis 'Pease' Tryon 1887, Manual of Conchology, (1) **9**: 180, pl. 37, fig. 94 (Sandwich Islands).

marmorea, Bulla 1860 [?1861], PZS, p. 431 (Sandwich Islands).

marmorea, Dolabrifera 'Pease' Paetel 1888, Catalog der Conchylien-Sammlung (Berlin), **1**:635 [nomen nudum].

marmorea, Margarita 1860 [?1861], PZS, p. 435 (Sandwich Islands).

marmoreus, Trochus 1868, AJC, **3**:287, pl. 24, fig. 9 (Paumotus).

marquesana, Helix 1868, AJC, **4**:153, pl. 12, fig. 2 (Marquesas Islands).

megastoma, Partula 1864 [1865], PZS, p. 675 [nomen nudum].

micans, Columbella 'Pease' Tryon 1883, Manual of Conchology, (1) 5:124 [nomen nudum].

microstoma, Nassa 1860, PZS, p. 145 (Sandwich Islands).

millecostata, Scalaria 1860 [?1861], PZS, p. 400 (Sandwich Islands).

minimus, Triphoris 1870 [1871], PZS, p. 774 (Howland Island; Kauai).

Mitroidea 1865, PZS, p. 514 [type species, *M. multiplicata* Pease, monotypic].

Mitropsis 1868, AJC, 3:211 [type species, *M. fusiformis,* monotypic].

modesta, Turricula 1868, AJC, 3:212, pl. 15, fig. 6 (no locality given).

monilifera, Engina 1860, PZS, p. 142 (Sandwich Islands).

monilifera, Pleurotoma 1869, AJC, 5:68 (Oahu).

monilifera, Turris 1860 [?1861], PZS, p. 398 (Sandwich Islands).

moussoni, Omphalotropis 1869, JC, **17**:147 [new name for *O. ovata* Mousson 1865; non Pease 1861].

?multicolor, Helicina 1864 [1865], PZS, p. 676 [nomen nudum].

multicostatus, Fossar 1860 [?1861], PZS, p. 398 (Sandwich Islands).

multiplicata, Mitroidea 1865, PZS, p. 514 (no locality given).

multistriata, Collonia 'Pease' Sowerby 1886, Thesaurus Conchyliorum, **5**:212 [nomen nudum].

multistriatus, Turbo 'Pease' Paetel 1887, Catalog der Conchylien-Sammlung (Berlin), **1**:537 [nomen nudum].

nebulosa, Borsonia 1860, PZS, p. 143 (Sandwich Islands).

nebulosa, Omphalotropis 1872, AJC, **7**:197 (Solomon Islands [Makela Id. on original label. This is probably meant for Makiva, which is another name for San Christoval Id.]).

nebulosus, Hexabranchus 1860, PZS, p. 33 (Sandwich Islands).

neglecta, Neritina 1860 [?1861], PZS, p. 435 (Sandwich Islands).

neglectus, Conus 1860 [?1861], PZS, p. 398 (Sandwich Islands) [is var. of *C. flavidus* Lamarck 1871, JC, **19**:99].

newcombii, Mitra 1869, AJC, 5:69 (Oahu).

nigra, Philinopsis 1860, PZS, p. 22 (Sandwich Islands).

nigra, Phyllidia 1868, AJC, 4:80, pl. 9, fig. 5 (Tahiti).

nigricans, Lobifera 1866, AJC, 2:206 (no locality given).

nigricans, Mitra 1865, PZS, p. 514 (no locality given [Marquesas]).

nigritella, Helix 1864 [1865], PZS, p. 675 [nomen nudum].

nigropunctata, Haminea 1868, AJC, 4:71, pl. 7, fig. 1 (Raiatea).

nigropunctatus, Pterogasteron 1871, AJC, **6**:304, pl. 22, fig. 2a-d (Tahiti).

nitens, Vertigo 1860 [?1861], PZS, p. 439 (Ebon Island, Marshall Group).

nitida, Hydrocena 1864 [1865], PZS, p. 674; 1869, JC, **17**:165, pl. 7, fig. 11 (*Assiminea*) (Huaheine [1869]).

nitida, Tornatellina 1860 [?1861], PZS, p. 439 (Ebon Island, Marshall Group).

nitidula, Mucronalia 1860 [?1861], PZS, p. 437 (Sandwich Islands).

nodicostata, Engina 1868, AJC, 3:274, pl. 23, fig. 8 (Paumotus).
nodifera, Drillia 1860, PZS, p. 145 (Sandwich Islands).
nodulosa, Drillia 1862 [1863], PZS, p. 279 (no locality given).
nodulosa, Engina 1869, AJC, 5:71, pl. 8, fig. 11 (Ebon Island).
nodulosa, Turricula (Pusia) 1868, AJC, 3:214, pl. 15, fig. 5 (Paumotus).
normalis, Helix 1864 [1865], PZS, p. 669 (no locality given).
nubilosa, Doris 1871, AJC, 7:13, pl. 6 (Huaheine).
nucea, Nassa 1869, AJC, 5:70, pl. 8, fig. 7 (Carolines).
nucleola, Doris 1860, PZS, p. 29 (Sandwich Islands).
obconica, Helix 1864 [1865], PZS, p. 669 (no locality given).
obesa, Partula 1868, AJC, 3:223, pl. 15, fig. 12 (locality unknown).
obliqua, Nassa 1865, PZS, p. 513 (no locality given).
oblonga, Tornatellina 1864 [1865], PZS, p. 673; 1871, PZS, p. 473 (Tahiti).
oblonga, Tugalia 1860 [?1861], PZS, p. 437 (Sandwich Islands).
oceanica, Helicina 1868, AJC, 3:226 (Kingsmill Islands).
ocellata, Elysia 1860, PZS, p. 35 (Sandwich Islands).
ochrostoma, Realia 1865, AJC, 1:287; 1866, AJC, 2:82, pl. 5, fig. 1; 1869, JC, 17:147 (*Omphalotropis*) (Aitutake).
olivacea, Carelia 1866, AJC, 2:293 (Sandwich Islands).
olivacea, Dolabrifera 1860, PZS, p. 22 (Sandwich Islands).
oppressa, Trochomorpha nigritella 1870, JC, 18:400; 1871, PZS, p. 457 (Ponape).
ordinata, Mitra 'Pease' Paetel 1887, Catalog der Conchylien-Sammlung (Berlin), 1:184 [nomen nudum].
oreosoma, Doris 1863 [1864], PZS, p. 510; 1868, AJC, 4:132 [new name for *D. excavata* Pease 1860; non Stimpson 1855].
ornata, Citharopsis 1868, AJC, 4:97, pl. 11, fig. 19 (Tahiti).
ornatum, Pterogasteron 1860, PZS, p. 36 (Sandwich Islands).
oryza, Marginella 1860, PZS, p. 147 [is *M. debilis* Pease 1871; non *M. oryza* Lamarck 1822].
oryza, Triphoris 1870 [1871], PZS, p. 776 (Kauai Island).
oualanensis, Helix 1866, AJC, 2:289, pl. 21, fig. 1 (?Onalan Island [Kusaie Id.]).
ovalis, Haminea 1868, AJC, 4:71, pl. 7, fig. 2 (Tahiti).
ovalis, Partula 1864 [1865], PZS, p. 675 [nomen nudum]; 1866, AJC, 2:194 (Raiatea).
ovalis, Pleurobranchus 1868, AJC, 4:79, pl. 9, fig. 2 (Tahiti).
ovata, Engina 1865, PZS, p. 513; 1868, AJC, 3:274, pl. 23, fig. 6 (Howland Island).
ovata, Hydrocena 1864 [1865], PZS, p. 674; 1869, JC, 17:148 (*Omphalotropis*) (Mangia Island [1869]).

ovata, Mucronalia 1860 [?1861], PZS, p. 437 (Sandwich Islands).

ovata, Succinea 1864 [1865], PZS, p. 675; 1868, AJC, 3:227 [nomen nudum].

pachystoma, Labiella 1869, JC, **17**:171 (Kauai Island).

pacifica, Helicina 1865, AJC, 1:291; 1866, AJC, 2:82, pl. 5, fig. 7 [redescribed as *flavescens,* 1867, AJC, 3:228, pl. 15, fig. 25; see note, 1871, PZS, p. 467 (Mangaia, type locality of *flavescens*)].

pacifica, Marginella 1868, AJC, 3:280, pl. 23, fig. 20 (Paumotus).

pacifica, Pedicularia 1865, PZS, p. 516; 1868, AJC, 4:96, pl. 11, figs. 17, 18 (Apaian Island [1868]).

pacifica, Truncatella 1868, AJC, 3:230, pl. 15, fig. 27 (Oualan).

pallens, Trochomorpha trochiformis 1870, JC, **18**:399; 1871, PZS, p. 457 (Moorea [1870]; Tahaa [1871]).

pallida, Columbella 'Pease' Pace 1902, Proc. Malac. Soc. London, **5**:118 [nomen nudum].

pallida, Mitra 1860, PZS, p. 146 (Sandwich Islands).

pallida, Taheitea [sic] 1868, AJC, 3:229 (Tahiti; Huaheine).

pallidus, Triphoris 1870 [1871], PZS, p. 774 (Kauai Island).

papillata, Doris 'Pease' Abraham 1877, PZS, p. 211 [error for *D. papillosa* Pease 1860; non Müller 1776].

papillosa, Doris 1860, PZS, p. 30 (Sandwich Islands) [is *D. tincta* Pease 1863 [1864], PZS, p. 510; non *papillosa* Kelaart 1858; Müller 1776].

papillosa, Lobifera 1866, AJC, 2:206 (no locality given).

parva, Engina 1868, AJC, 3:276, pl. 23, fig. 11 (Paumotus).

parva, ?Pterocyclos 1865, AJC, 1:290; 1866, AJC, 2:82, pl. 5, fig. 8; *Diadema parva,* 1868, AJC, 4:158 (Aitutake, Hervey Group, Cook Islands [1868]).

parvum, Cyclostoma 1864 [1865], PZS, p. 674; 1871, PZS, p. 476 (Tahiti).

parvidens, Helix 1861, PZS, p. 243 (Tahiti).

parvula, Aeolis 1860, PZS, p. 35 (Sandwich Islands).

parvula, Helicina 1868, AJC, 4:156, pl. 12, fig. 10 (Atiu Island).

parvum, Cyclostoma 1864 [1865], PZS, p. 674 (no locality given).

parvus, Conus 1868, AJC, 4:126 [new name for *C. fusiformis* Pease 1860; non Lamarck 1810].

paucicostata, Cithara 1868, AJC, 3:217 (Tahiti).

paucicostata, Clathurella 1860, PZS, p. 144 (Sandwich Islands).

paucicostata, Pithys 1870, JC, **18**:395 (Kauai).

paumotensis, Marginella 1868, AJC, 3:281, pl. 23, fig. 22 (Paumotus).

paumotensis, Scalaria 1868, AJC, 3:289, pl. 24 bis., fig. 11 (Paumotus).

paxillum, Cerithium 1860 [?1861], PZS, p. 433 (Sandwich Islands).

pellucida, Columbella 1860 [?1861], PZS, p. 399 (Sandwich Islands) [is *C. rorida* Reeve, Pease 1868, AJC, 4:122].

pellucida, Partula 1871, PZS, p. 457 (Guadalcanal, Solomon Islands).
pellucida, Polybranchia 1860, PZS, p. 141 (Sandwich Islands).
pellucidus, Pleurobranchus 1860, PZS, p. 24 (Sandwich Islands).
Perdicella 1869 [1870], PZS, p. 648 [no type species given].
perfectus, Triphorus 1870 [1871], PZS, p. 775 (Kauai).
perlonga, Vertigo 1871, PZS, p. 462 (Oahu).
perplexa, Scalaria 1868, AJC, 3:288 (Hawaii).
Philinopsis 1860, PZS, p. 21 [type species not given].
picea, Strigatella 1860, PZS, p. 146 (Sandwich Islands).
picta, Collonia 1868, AJC, 4:91, pl. 11, figs. 2, 3 (Paumotus).
picta, Doris 1860, PZS, p. 29 (Sandwich Islands).
picta, Helicina 1864 [1865], PZS, p. 676 [nomen nudum].
picta, Lobiger 1868, AJC, 4:75, pl. 8, fig. 3 (Huaheine).
picta, Trevelyana 1871, AJC, 6:301, pl. 20, fig. 1 (Huaheine).
pilosa, Doris 1860, PZS, p. 27 (Sandwich Islands).
pilosa, Melibe 1860, PZS, p. 34 (Sandwich Islands).
plana, Libratula 1865, PZS, p. 512 (no locality given).
planilabrum, Partula 1864 [1865], PZS, p. 672 (no locality given).
plicatula, Turricula (Costellaria) 1868, AJC, 3:213, pl. 15, fig. 4 (Paumotus).
plumbea, Planaxis 1861, PZS, p. 244 (Sandwich Islands).
polita, Marginella 1868, AJC, 3:280, pl. 23, fig. 19 (Tarawa Island).
polita, Odostomia 1868, AJC, 3:291, pl. 24, fig. 17 (Tahiti).
Polybranchia 1860, PZS, p. 141 [type species, *P. pellucida* Pease, monotypic].
porphyrostoma, Amastra 1869, JC, 17:172 (Oahu Island).
producta, Aclesia 1866, AJC, 2:207 (no locality given).
producta, Clathurella 1860, PZS, p. 143 (Sandwich Islands).
producta, Partula 1864 [1865], PZS, p. 671 (no locality given).
producta, Ranella 1860 [?1861], PZS, p. 397 (Sandwich Islands).
producta, Realia 1864 [1865], PZS, p. 673; 1869, JC, 17:151, pl. 7, fig. 8 *(Omphalotropis)*; 1871, PZS, p. 471 *(Atropis)* (Tahaa [1869]; Raiatea [1871]).
propinqua, Terebra 1869, AJC, 5:66 (Island of Hawaii).
propinquata, Doris 1860, PZS, p. 28 (Sandwich Islands).
prostrata, Helix 1864 [1865], PZS, p. 670 (no locality given).
protea, Partula 1864 [1865], PZS, p. 675 [nomen nudum].
proximus, Helicter 1862, PZS, p. 6 (Molokai).
Pterogasteron 1860, PZS, p. 35 [no type species given].
pudica, Mitra 1860, PZS, p. 146 (Sandwich Islands) [see note, 1868, AJC, 4:120].
pulchella, Clathurella 1860, PZS, p. 144 (Sandwich Islands).
pulchellus, Hexabranchus 1860, PZS, p. 33 (Sandwich Islands).

pulchra, Auriculla 1871, JC, **16**:346, pl. 14, fig. 6 (Hawaiian Islands).

pulchra, Doris 1861, PZS, p. 247 (no locality given).

punctata, Syphonota 1868, AJC, 4:77, pl. 9, fig. 2 (Huaheine).

punctatus, Triphoris 1870 [1871], PZS, p. 775 (Annaa Island).

Pupoidea 1865, AJC, 1:290; 1871, PZS, p. 465 [type species, *Cyclophorus ? scalariformis* Pease, monotypic]. [*Pupoidea* was proposed as a new genus for *scalariformis* though described with a question under *Cyclophorus*. In 1871, Pease listed his genus as a synonym of *Palaina* Semper.]

purus, Conus 1862 [1863], PZS, p. 279; 1871, JC, **19**:98 (Niihau Island [1871]).

pusilla, Columbella 1862 [1863], PZS, p. 244; 1868, AJC, 4:122 (Kingsmill Islands) [is *C. fusiformis* Pease 1868; non *pusilla* Sowerby 1844].

pusilla, Cythara 1860, PZS, p. 147 (Sandwich Islands).

pusilla, Distorsio 1860 [?1861], PZS, p. 397 (Sandwich Islands).

pusilla, Haminea 1860, PZS, p. 20 (Sandwich Islands).

pusilla, Triton 1860 [?1861], PZS, p. 434 (Sandwich Islands).

pustulosus, Triphoris 1870 [1871], PZS, p. 776 (Kauai Island).

putillus, Turricula 1865, PZS, p. 514; 1868, AJC, 3:214, pl. 15, fig. 24 (Central Pacific [1868]).

pyriformis, Marginella 1868, AJC, 3:280, pl. 23, fig. 21 (Paumotus).

pyriformis, Volvatella 1868, AJC, 4:73, pl. 7, fig. 5 (Huaheine).

radiata, Avicula 1862 [1863], PZS, p. 244 (Kingsmill Islands).

radiata, Partula 1864 [1865], PZS, p. 675 [nomen nudum].

radiata, Tectura 1860 [?1861], PZS, p. 437 (Sandwich Islands).

recta, Partula 1864 [1865], PZS, p. 675 [nomen nudum]; 1868, AJC, 4:155, pl. 12, fig. 8 (Marquesas Islands).

reticulata, Doris 1860, PZS, p. 26 (Sandwich Islands).

reticulatus, Goniobranchus 1866, AJC, 2:205, pl. 14, fig. 1 (no locality given).

reticulatus, Pleurobranchus 1860, PZS, p. 25; 1863 [1864], PZS, p. 510 (Sandwich Islands) [is *violaceous* Pease 1863; non *reticulatus* Kelaart 1859; Rang 1832].

retunsa, Helix 1864 [1865], PZS, p. 670 (no locality given).

robusta, Hydrocaena 1864 [1865], PZS, p. 676 [nomen nudum].

robusta, Omphalotropis 1869, JC, **17**:148, pl. 7, fig. 3 (Raiatea [Society Islands on original label]).

robusta, Partula 1864 [1865], PZS, p. 675 [nomen nudum].

robustus, Stylifer 1860 [?1861], PZS, p. 437 (Sandwich Islands).

robustus, Triphoris 1870 [1871], PZS, p. 775 (Makaimo Island).

roratongensis, Pithys 1870, JC, **18**:395; 1871, PZS, p. 453 (*Pitys*) (Roratonga Island).

rosacea, Gena 1868, AJC, 3:284, pl. 24, fig. 1 (Paumotus).

rosacea, Odostomia 1868, AJC, 3:292, pl. 24, fig. 19 (Paumotus).
rosacea, Terebra 1869, AJC, 5:65 (Oahu).
rosea, Mucronalia 1860 [?1861], PZS, p. 437 (Sandwich Islands).
rotella, Diadema 1868, AJC, 4:158, pl. 12, fig. 13 (Atiu).
rotellina, Pithys 1870, JC, 18:393; 1871, PZS, p. 453 (*Pitys*) (Aitutake Island).
rubella, Succinea 1871, PZS, p. 460 (Lanai).
rubicunda, Helicina maugeriae 1864 [1865], PZS, p. 676 [nomen nudum]; 1868, AJC, 3:227; 1871, PZS, p. 466 (Raiatea).
rubida, Catinella 1870, JC, 18:97 (Kauai).
rubida, Dentiora 1862 [1863], PZS, p. 240 (Sandwich Islands).
rubida, Neritina 1865, PZS, p. 514; 1868, AJC, 3:285, pl. 24, fig. 5 (Tahiti).
rubra, Alcyna 1860 [?1861], PZS, p. 436 (Sandwich Islands).
rubra, Odostomia 1868, AJC, 3:291, pl. 24, fig. 18 (Paumotus).
rubra, Stenodoris 1866, AJC, 2:206, pl. 14, fig. 2 (no locality given).
rubrilineata, Doris 1871, AJC, 7:12, pl. 3, fig. 2 (Tahiti).
rudis, Neritina 1868, AJC, 3:285, pl. 24, fig. 4 (Ponape).
rufescens, Helicina 1864 [1865], PZS, p. 676 [nomen nudum].
rufescens, Pterogasteron 1871, AJC, 6:304, pl. 22, fig. 1a-c (Tahiti).
rufomaculata, Chromodoris 1871, AJC, 7:17, pl. 8, fig. 1 (Huaheine).
rufus, Pleurobranchus 1860, PZS, p. 25 (Sandwich Islands).
rugata, Helix 1866, AJC, 2:291 (Sandwich Islands).
rugosa, Doris 1860, PZS, p. 31 (Sandwich Islands).
rugulosa, Amastra 1870, JC, 18:95 (Kauai).
rugulosa, Helicina 1868, AJC, 4:157, pl. 12, fig. 11 (Tahaa).
rugulosum, Sistrum 1868, AJC, 4:93, pl. 11, fig. 7 (Howland Island).
rustica, Partula 1864 [1865], PZS, p. 675 [nomen nudum]; 1866, AJC, 2:199; 1867, AJC, 3:81, pl. 1, fig. 5 (?Society Islands).
rutella, Succinea 1864 [1865], PZS, p. 675 [nomen nudum].
sagitta, Columbella 'Pease' Pace 1902, Proc. Malac. Soc. London, 5:132 [nomen nudum].
saltata, Mitra 1865, PZS, p. 512 (no locality given).
sandwicensis, Daphnella 1860, PZS, p. 148 (Sandwich Islands).
sandwicensis, Erato 1860, PZS, p. 146 (Sandwich Islands).
sandwicensis, Marginella 1860, PZS, p. 146 (Sandwich Islands).
sandwicensis, Oliva 1860, PZS, p. 145 (Sandwich Islands).
sandwicensis, Patella 1860 [?1861], PZS, p. 437 (Sandwich Islands).
sandwicensis, Pedipes 1860, PZS, p. 146 (Sandwich Islands).
sandwicensis, Tornatina 1860, PZS, p. 19 (Sandwich Islands).
sandwicensis, Turbo 1860 [?1861], PZS, p. 436 (Sandwich Islands).
sandwicensis, Vitularia 1860 [?1861], PZS, p. 397 (Sandwich Islands).

sandwichensis, Columbella 1861, PZS, p. 244 (Sandwich Islands) [is *C. turturina* Lamarck 1822, Pease, 1868, AJC, 4:122].

sandwichensis, Fossar 'Pease' Nevill 1884, Hand List of Mollusca in the Indian Museum (Calcutta), 2:165 [nomen nudum].

scabra, Doriopsis 1871, AJC, 6:300, pl. 19, fig. 2a-c (Tahiti).

scabriuscula, Doris 1860, PZS, p. 27 (Sandwich Islands).

scalariformis, ?Cyclophorus 1865, AJC, 1:289; 1866, AJC, 2:82, pl. 5, fig. 6; 1871, PZS, p. 465 (*Palaina*) (Caroline Islands [1871]).

scalariformis, Realia 1865, AJC, 1:288; 1866, AJC, 2:82, pl. 5, fig. 3; 1869, JC, 17:159 (Atiu).

Scalinella 1867, AJC, 3:225 [type species not given].

sculpta, Nucula 1860, PZS, p. 189 (Corea Sea [Korea]).

sculptilis, Coralliobia 1865, PZS, p. 513 (no locality given).

sculptilis, Helix 1864 [1865], PZS, p. 669 (Central Pacific).

sculptilis, Terebra 1869, AJC, 5:64 (Oahu).

sculptum, Cerithium 1869, AJC, 5:77, pl. 8, fig. 8 (Paumotus).

scuta, Helix 1864 [1865], PZS, p. 675 [nomen nudum].

sectilis, Mitra 1868, AJC, 3:271 (Hawaii).

semicostata, Rissoa 1868, AJC, 3:296, pl. 24, fig. 32 (Caroline Islands).

semicostatus, Turbo 1860 [?1861], PZS, p. 435 (Sandwich Islands).

semidecora, Aeolis 1860, PZS, p. 34 (Sandwich Islands).

Seminella 1868, AJC, 3:233–234 [no type species given].

semiplicata, Melampus (Tralia) 1860, PZS, p. 146 (Sandwich Islands).

semiplicata, Rissoina 1862 [1863], PZS, p. 242; 1868, AJC, 3:295, pl. 24, fig. 29 (Howland Island).

semiplicata, Vanikoro 1860 [?1861], PZS, p. 435 (Sandwich Islands).

semistriata, Amphiperas 1862 [1863], PZS, p. 241; 1868, AJC, 4:96, pl. 11, fig. 16 (Ponape Island [1868]).

semistriata, Atys 1860, PZS, p. 20 (Sandwich Islands).

serrata, Lamellina 1860 [?1861], PZS, p. 439 (Ebon Island, Marshall Group).

setosa, Doris 1860, PZS, p. 26 (Sandwich Islands).

similis, Triphoris 1870 [1871], PZS, p. 774 (Kauai Island).

simillima, Haminea 1868, AJC, 4:72, pl. 7, fig. 3 (Tahiti).

simillima, Helix 1864 [1865], PZS, p. 699 (no locality given).

simplaria, Vertigo 1871, PZS, p. 461 (Marquesas Islands).

simplex, Chromodoris 1871, AJC, 7:17, pl. 8, fig. 2 (Maiao).

simplex, Leptachatina 1869, JC, 17:170 (Hawaii Island).

simplex, Olivella (Callianax) 1868, AJC, 3:281, pl. 23, fig. 24 (Paumotus).

simplex, Tornatellina 1864 [1865], PZS, p. 673 [no locality given].

simulans, Partula 1864 [1865], PZS, p. 675 [nomen nudum]; 1866, AJC, 2:202; 1867, AJC, 3:81, pl. 1, fig. 11 (Society Islands).

sinistralis, Partula 'Pease' Pilsbry 1900, Manual of Conchology, (2) **20:**185 [ms. name of Pease in the synonymy of *Partula otaheitana* Bruguière].
sinistrorsa, Partula 1864 [1865], PZS, p. 675 [nomen nudum].
solida, Amastra 1869, JC, **17:**173 (Oahu).
solida, Helicina 1864 [1865], PZS, p. 673 (no locality given).
soliduscula, Magilus 'Pease' Sowerby 1872 [in] Reeve, Conchologia Iconica, **18**, Magilus, pl. 4, species no. 12.
sordida, Doris 1871, AJC, **7:**14, pl. 4, fig. 2 (Tahiti).
speciosa, Philinopsis 1860, PZS, p. 21 (Sandwich Islands).
sphaerica, Amastra 1870, JC, **18:**94 (Kauai).
squamosum, Sistrum 1868, AJC, **3:**277, pl. 23, fig. 14 (Kingsmill Islands).
squamosus, Latirus 1862 [1863], PZS, p. 240; 1868, AJC, **3:**278, pl. 23, fig. 16 (Baker Island).
squamulosa, Fastigiella 1868, AJC, **3:**290, pl. 24, fig. 15 (Paumotus).
Stenodoris 1866, AJC, **2:**205 [type species, *S. rubra* Pease, monotypic].
striolata, Partula 1864 [1865], PZS, p. 675 [nomen nudum]; 1866, AJC, **2:**198 (Tahitian Archipelago).
straminea, Helicina 1864 [1865], PZS, p. 676 [nomen nudum].
striata, Alcyna 1869, AJC, **5:**70 (Island of Hawaii).
striata, Chondrella 1871, PZS, p. 477 (Insula Roratonga).
striata, Engina 1868, AJC, **3:**275, pl. 23, fig. 10 (Paumotus).
striata, Odostomia 1868, AJC, **3:**291, pl. 24, fig. 16 (Paumotus).
striatula, Rissoina 1868, AJC, **3:**296, pl. 24, fig. 31 (Paumotus).
striatula, Vertigo 1871, PZS, p. 461 (Hawaii Island).
striatum, Sistrum 1868, AJC, **3:**276, pl. 23, fig. 12 (Kingsmill Islands).
striatus, Melampus (Tralia) 1861, PZS, p. 244; 1868, AJC, **4:**100, pl. 12, fig. 14 (Tahiti).
strigata, Cythara 1862 [1863], PZS, p. 242 (no locality given).
strigata, Partula 1868, AJC, **4:**155, pl. 12, fig. 7 (Marquesas Islands).
strigata, Pisania 1862 [1863], PZS, p. 241; 1868, AJC, **4:**93, pl. 11, fig. 6 (Ponape [1868]).
striolata, Helix 1860 [?1861], PZS, p. 439 (Ebon Island, Marshall Group).
striolata, Partula 1864 [1865], PZS, p. 675 [nomen nudum]; 1866, AJC, **2:**197; 1867, AJC, **3:**81, pl. 1, fig. 4 (Tahitian Archipelago).
subangulata, Alcyna 1860 [?1861], PZS, p. 436 (Sandwich Islands).
subangulata, Partula faba 1870, JC, **18:**401; 1871, PZS, p. 458 (Tahaa).
subpellucida, Eulima 1865, PZS, p. 515; 1868, AJC, **4:**94 (Tahiti).
subrufa, Helicina 1864 [1865], PZS, p. 676 [nomen nudum].
subviridis, Vitrina 1868, AJC, **4:**154, pl. 12, fig. 5 (Marquesas Islands).
suffusa, Terebra 1869, AJC, **5:**65 (Oahu).
sulcata, Terebra 1869, AJC, **5:**67 (Oahu).
sulcifera, Torinia 1869, AJC, **5:**79 (Kauai).
sulcosus, Triphoris 1870 [1871], PZS, p. 774 (Kauai Island).

suturalis, Partula 1864 [1865], PZS, p. 675 [nomen nudum].

symmetrica, Scalaria 1868, AJC, 3:290, pl. 24, fig. 14 (Tahiti).

tahitensis, Cyclostoma 1861, PZS, p. 243; 1869, JC, **17**:158, pl. 7, fig. 1 (*Scalinella*) (Huaheine; Tahaa [1869]).

tahitensis, Dolabrifera 1861, PZS, p. 245; 1868, AJC, 4:77, pl. 8, fig. 5 (Tahiti).

tahitensis, Helicina 1871, PZS, p. 466 (Tahitian Islands) [new name for *H. pisum* Rousseau 1854; non Philippi 1847].

tahitensis, Tectura 1868, AJC, 4:98, pl. 11, fig. 21 (Tahiti).

tenebrosa, Leptachatina 1870, JC, **18**:92 (Kauai).

tenuicostata, Leptachatina 1869, JC, **17**:170 (Hawaii Island).

tenuiscula, Helicina 1864 [1865], PZS, p. 676 [nomen nudum]; 1868, AJC, 3:226 (Tahaa) [nomen nudum].

tenuistriata, Rissoina 1868, AJC, 3:295, pl. 24, fig. 30 (Paumotus).

tessellatus, Pleurobranchus. Described without name (1861, PZS, p. 245) and named (1863 [1864], PZS, p. 510; 1868, AJC, 4:80, pl. 9, fig. 4) (Pacific Islands).

tincta, Doris 1863 [1864], PZS, p. 510; 1868, AJC, 4:132 [new name for *D. papillosa* Pease 1860; non *papillosa* Müller 1776].

triangulatum, Sistrum 1868, AJC, 3:278, pl. 23, fig. 15 (Hawaii).

tricarinatum, Bittium 1860 [?1861], PZS, p. 433 (Sandwich Islands).

trigonalis, Pinna 1861, PZS, p. 242 (Kingsmill Islands).

trilineata, Partula 1864 [1865], PZS, p. 675 [nomen nudum]; 1866, AJC, 2:195; 1867, AJC, 3:81, pl. 1, fig. 1 (Tahiti).

triplicata, Auriculella 1868, JC, **16**:346 (Hawaiian Islands).

triticea, Rissoina 1860 [?1861], PZS, p. 438 (Sandwich Islands).

triticea, Triphoris 1860 [?1861], PZS, p. 433 (Sandwich Islands).

Truella 1871, PZS, p. 459 [type species, *Succinea elongata* Pease, original designation].

tuberculatus, Triphoris 1870 [1871], PZS, p. 776 (Kauai Island).

tuberculiferum, Cerithium 1869, AJC, 5:76 [new name for *C. adansonii* Reeve 1865, Conchologia Iconica, **15**, pl. 2, species no. 11 (Paumotus); non Bruguière 1792].

tuberculosa, Engina 1862 [1863], PZS, p. 243; 1867, AJC, 3:274 (Baker Island).

tumida, Clathurella 1868, AJC, 3:218, pl. 15, fig. 14 (Paumotus).

tumida, Hyalopsis 1871, AJC, 7:27, pl. 9, fig. 6 (Solomon Islands).

turbinatus, Omphalius 1869, AJC, 5:84, pl. 8, fig. 15 (La Paz, Gulf of California).

turbinella, Helicina 1864 [1865], PZS, p. 676 [nomen nudum].

turgidula, Leptachatina 1870, JC, **18**:89 (Kauai).

turgidula, Limnaea 1870, AJC, **6**:5, pl. 3, fig. 3 (Oahu).

turgidus, Bulimus 1864 [1865], PZS, p. 670 (no locality given).

turricula, Partula 1864 [1865], PZS, p. 675 [nomen nudum]; 1872, AJC, **7**:196 ([?]New Hebrides).

turricula, Rissoina 1860 [?1861], PZS, p. 438 (Sandwich Islands).

umbilicata, Cassis 1860 [?1861], PZS, p. 436 (Sandwich Islands).

umbilicata, Partula 1864 [1865], PZS, p. 675 [nomen nudum]; 1866, AJC, **2**:200; 1867, AJC, **3**:81, pl. 1, fig. 7 (Society Islands).

umbilicata, Scalaria 1869, AJC, **5**:76 (Oahu).

undato-lirata, Patella 'Pease' Dall 1871, AJC, **6**:279 [see notes, 1872, AJC, **7**:198].

undulata, Natica 'Pease' Tryon 1886, Manual of Conchology, (1) **8**:23 [nomen nudum].

unilineatum, Cerithium 1860 [?1861], PZS, p. 432 (Sandwich Islands).

uniplicata, Auriculella 1868, JC, **16**:344, pl. 14, figs. 7, 7a (Maui).

varia, Cythara 1860, PZS, p. 147 (Sandwich Islands).

variabilis, Carelia 1870, JC, **18**:402 (Kauai).

variabilis, Collonia 1860 [?1861], PZS, p. 436 (Sandwich Islands).

variabilis, Engina 1868, AJC, **3**:275, pl. 23, fig. 9 (Paumotus).

variabilis, Partula 1864 [1865], PZS, p. 675 [nomen nudum]; 1866, AJC, **2**:203; 1867, AJC, **3**:81, pl. 1, fig. 12 (?Society Islands).

variabilis, Realia 1865, AJC, **1**:288; 1866, AJC, **2**:82, pl. 5, fig. 2; 1869, JC, **17**:148 (*Omphalotropis*) (Atiu [1869]; Tonga Islands [1872, AJC, **7**:197]).

varians, Chromodoris 1871, AJC, **7**:19, pl. 9, fig. 2 (Huaheine; Maiao).

varians, Pleurobranchus 1860, PZS, p. 25 (Sandwich Islands).

varicifera, Daphnella 1868, AJC, **3**:221, pl. 15, fig. 21 (Paumotus).

variegata, Chromodoris 1871, AJC, **7**:15, pl. 7, fig. 1 (Tahiti).

variegata, Dolabella 1860, PZS, p. 22 (Sandwich Islands).

variegatus, Placobranchus 1871, AJC, **6**:303, pl. 21, fig. 2a, b (Huaheine).

venosus, Helix 1866, AJC, **2**:290, pl. 21, fig. 2 (no locality given).

venusta, Columbella 'Pease' Pace 1902, Proc. Malac. Soc. London, **5**:150 [nomen nudum].

venusta, Eulima 1868, AJC, **3**:294, pl. 24, fig. 24 (Tahiti).

verecunda, Pithys 1870, JC, **18**:397; 1871, PZS, p. 454 (*Pitys*) (Marquesas Islands).

verticillata, Helix 1864 [1865], PZS, p. 675 [nomen nudum]; 1868, AJC, **3**:228 (*Nanina*) (Moorea).

vescoi, Helicina 'Dohrn' Pease 1864 [1865], PZS, p. 676 [nomen nudum].

vexillum, Partula 1864 [1865], PZS, p. 675 [nomen nudum]; 1866, AJC, **2**:198; 1867, AJC, **3**:81, pl. 1, fig. 8 (Society Islands).

vibrata, Doris 1860, PZS, p. 28 (Sandwich Islands).

villosa, Doris 1871, AJC, **7**:11, pl. 3, fig. 1 (Huaheine).

violacea, Clathurella 1868, AJC, **3**:218, pl. 15, fig. 15 (Paumotus).

violaceus, Pleurobranchus 1863 [1864], PZS, p. 510; 1868, AJC, 4:132 [new name for *P. reticulatus* Pease 1860; non Kelaart 1859].

virescens, Pachypoma 1869, AJC, 5:73, pl. 8, fig. 10 (Tarawa Island).

virginea, Partula 1864 [1865], PZS, p. 675 [nomen nudum].

virgulata, Partula assimilis 1870, JC, **18**:401 (Roratonga).

viridans, Cyclostoma 1864 [1865], PZS, p. 676 [nomen nudum].

viridescens, Cyclostoma 1861, PZS, p. 243; 1869, JC, **17**:153, pl. 7, fig. 7 (*Omphalotropis*) (Huaheine).

viridescens, Syphonota 1868, AJC, 4:77, pl. 10, fig. 1 (Kingsmill Islands).

viridis, ?Acanthochites 1872, AJC, **7**:194 (Kauai).

viridis, Carelia variabilis 1870, JC, **18**:402 (east side of Kauai).

viridis, Doriopsis 1861, PZS, p. 244; 1871, AJC, **6**:301, pl. 19, fig. 1a-c (Tahiti).

viridis, Lobiger. Described without species name (1861, PZS, p. 246) and named (1863 [1864], PZS, p. 510) (Pacific Islands).

viridis, Lophocercus 1861, PZS, p. 246; 1868, AJC, 4:74, pl. 8, figs. 1, 2 (Huaheine [1868]).

vitrea, Bullina 1860, PZS, p. 19 (Sandwich Islands).

vitrea, Tornatellides 'Pease' Dohrn 1863, Malakozoologische Blätter, **10**:162 [see Manual of Conchology, (2) **23**:203, 1915].

vittata, Partula 1864 [1865], PZS, p. 675 [nomen nudum]; 1866, AJC, **2**:194 (Society Islands).

Volvatella 1860, PZS, p. 20; 1868, AJC, 4:73, pl. 7, fig. 4 (Sandwich Islands) [type species, *V. fragilis* Pease, monotypic].

zigzac, Helicina 1868, AJC, 3:229 (Oualan).

Localities Needing Additional Data

The following list of locality names indicates those for which Pease needed additional data:

Aitutake Island [Aitutaki, Cook Islands]
Annaa Island [Anaa, Tuamotu Archipelago]
Apaian Island [Abaiang Island, Gilbert Islands]
Apaiang Island [Abaiang Island, Gilbert Islands]
Apiana Island [Abaiang Island, Gilbert Islands]
Ascension Island [old name for Ponape, Caroline Islands]
Atiu Island, Cook Islands
Baker Island [0°13′30″N; 176°29′30″W]
Bolabola Island [Borabora, Society Islands]
Ebon Island, Marshall Islands
Fanning Island [3°51′25″N; 159°22′W]
Guam Island, Marianas Islands

Howland Island [0°49′N; 176°40′W]
Huaheine Island, Society Islands
Jarvis Island, Line Islands [0°22′33″S; 159°54′11″W]
Kauai, Hawaiian Islands
Kingsmill Islands [Kingsmill Group, Gilbert Islands]
Lanai Island, Hawaiian Islands
Maiao Island [= Tubuai Manu Island, Society Islands]
Makaimo Island [?Makemo, Tuamotu Archipelago]
Mangaia Island, Cook Islands
Mangia Island [Mangaia Island, Cook Islands]
Maui Island, Hawaiian Islands
Molokai Island, Hawaiian Islands
Niihau Island, Hawaiian Islands
Niüe Island [south of the Samoan Islands: 19°S; 170°W]
Nukahiva, Marquesas Islands
Oahu, Hawaiian Islands
Oualan [= Kusaie Island, Caroline Islands]
Paumotus [Tuamotu Islands]
Ponape Island, Caroline Islands
Raiatea Island, Society Islands
Roratonga Island [Rarotonga, Cook Islands]
Sandwich Islands [= Hawaiian Islands]
Tahaa, Society Islands
Tahiti, Society Islands
Tarawa Island, Gilbert Islands
Tutuila, Samoan Islands
Vavau Island, Tonga Islands

A Bibliography of William Harper Pease

1848 "Observations on the Geology and Natural History of Mexico." *Proc. Acad. Nat. Sci. Phila.*, 4:91–94.

1850 "The Value of Science Applied to Agriculture." *Royal Hawaiian Agricultural Soc.*, pp. 58–65.

1852 "The Geological History of the Islands and Types of Soils." *Royal Hawaiian Agricultural Soc.*, pp. 130–136.

1860a "Descriptions of New Species of Mollusca from the Sandwich Islands, Pt. I." *Proc. Zool. Soc. London*, pp. 18–36.

1860b "Descriptions of New Species of Planariidae Collected in the Sandwich Islands." *Proc. Zool. Soc. London*, pp. 37–38, pl. 70.

[This paper was written entirely by J. E. Gray and not Pease, as its listing would indicate. See footnote on p. 37 of the PZS, 1860, and note by Pease, PZS, 1863 (1864), p. 510.]

1860c "Descriptions of New Species of Mollusca from the Sandwich Islands, Pt. II." *Proc. Zool. Soc. London,* pp. 141–148.

1860d "Descriptions of Three Species of Marine Shells from the Pacific Ocean." *Proc. Zool. Soc. London,* pp. 189, 190.

1860e [1861] "Descriptions of Seventeen New Species of Marine Shells from the Sandwich Islands, in the Collection of Hugh Cuming." *Proc. Zool. Soc. London,* pp. 397–400.

1860f [?1861] "Descriptions of Forty-Seven New Species of Shells from the Sandwich Islands, in the Collection of Hugh Cuming." *Proc. Zool. Soc. London,* pp. 431–438.

1860g [?1861] "Descriptions of Six New Species of Land Shells from the Island of Ebon, Marshall's Group, in the Collection of H. Cuming." *Proc. Zool. Soc. London,* pp. 439, 440.

1861 "Descriptions of New Species of Mollusca from the Pacific Islands." *Proc. Zool. Soc. London,* pp. 242–247.

1862a "Descriptions of Two New Species of Helicter (Achatinella, Swain.) from the Sandwich Islands, with a History of the Genus." *Proc. Zool. Soc. London,* pp. 3–7.

1862b "Catalogue des Espèces de Rissoina des Iles Sandwich et Déscription d'une Espèce Nouvelle." *J. Conchyliologie,* **10**:381–383.

1862c "Catalogue of Works Relating to the Hawaiian or Sandwich Islands." *Friend,* May, pp. 34–39.

1862d "An Appendix" [comments on Cook's and Cleveland's voyages and excerpts from the manuscript of Reverend S. Greathead]. *Friend,* June, pp. 42, 43.

1862e [1863] "Descriptions of New Species of Shells from the Pacific Islands." *Proc. Zool. Soc. London,* pp. 243–245.

1862f [1863] "Description of a New Genus of Marine Shells from the Sandwich Islands." *Proc. Zool. Soc. London,* p. 240.

1862g [1863] "Description of New Species of Marine Shells from the Pacific Islands." *Proc. Zool. Soc. London,* pp. 240–243.

1862h [1863] "Description of New Species of Marine Shells from the Pacific Islands." *Proc. Zool. Soc. London,* pp. 278–280.

1863 [1864] "On Errors and Omissions in Former Communications." *Proc. Zool. Soc. London,* p. 510.

1864a "On the Principal Divisions of the Pacific Fauna." *Rep. Brit. Assoc. Adv. Sci.,* pp. 101, 102.

1864b [1865] "Descriptions of New Species of Land Shells from the Islands of the Central Pacific." *Proc. Zool. Soc. London,* pp. 668–676. [According to a prefatory note by P. P. Carpenter, many species submitted for publication by Pease, both as specimens and descriptions, were not published. All were first compared by Mr. Cuming with material in his collection; those considered synonyms were listed only as manuscript names at the end of the article. Several of these were later published by Pease in other publications.]

1864c [1865] "Remarks on the Species of *Succinea* Inhabiting the Tahitian Archipelago, with Descriptions of a New Species." *Proc. Zool. Soc. London,* pp. 676, 677.

1865a "On the Synonymy of *Sistrum cancellatum.*" *Proc. Zool. Soc. London,* pp. 52, 53.

1865b "Description of a New Species of *Latirus* and Remarks on Others Inhabiting the Pacific Islands." *Proc. Zool. Soc. London,* pp. 53, 54.

1865c "Descriptions of New Genera and Species of Marine Shells from the Islands of the Central Pacific." *Proc. Zool. Soc. London,* pp. 512–517.

1865d "Descriptions of New Species of *Phaneropneumona* inhabiting Polynesia." *Amer. J. Conch.,* 1:287–291.

1865e "Descriptions of New Species of Land Shells from the Islands of the Central Pacific." *Amer. J. Conch.,* 1:368–370. Reprinted from *Proc. Zool. Soc. London,* 1865, pp. 512–517.

1866a "Descriptions of New Species of *Partula* Inhabiting the Tahitian Archipelago." *Amer. J. Conch.,* 2:193–203.

1866b "Remarks on Nudibranchiata Inhabiting the Pacific Islands, with Descriptions of Two New Genera." *Amer. J. Conch.,* 2:204–208.

1866c "Descriptions of New Species of Land Shells Inhabiting Polynesia." *Amer. J. Conch.,* 2:289–293.

1866d "*Partula fasciata* Pease = *P. ganymedes* Pfr." *Amer. J. Conch.,* 2:293.

1867 "Illustrations of New Species of *Partula.*" *Amer. J. Conch.,* 3:81, pl. 1.

1868a "Notes on the Remarks of Dr. P. P. Carpenter (Published in *Proc. Zool. Soc. London,* 1865) on Certain Species of Marine Gasteropoda Named by W. Harper Pease." *Amer. J. Conch.,* 3:231–234.

1868b "Descriptions of Marine Gasteropodae Inhabiting Polynesia." *Amer. J. Conch.,* 3:211–222, pl. 15.

1868c "Descriptions of New Species of Land Shells Inhabiting Polynesia." *Amer. J. Conch.,* 3:223-230, pl. 15.

1868d "Descriptions of Sixty-Five New Species of Marine Gasteropodae Inhabiting Polynesia." *Amer. J. Conch.*, **3**:271–297, pls. 23, 24.

1868e "Descriptions of Marine Gasteropodae Inhabiting Polynesia." *Amer. J. Conch.*, **4**:71–80, pls. 7–10.

1868f "Déscriptions d'Espèces Nouvelles d'Auriculella, Provenant des Îles Hawaï. *J. Conchyliologie*, **16**:342–349.

1868g "Descriptions of Marine Gasteropodae Inhabiting Polynesia." *Amer. J. Conch.*, **4**:91–102, pls. 11, 12.

1868h "Synonymy of Marine Gasteropodae Inhabiting Polynesia." *Amer. J. Conch.*, **4**:103–132.

1868i "Descriptions of a New Species of Genus *Latirus* Montf." *Amer. J. Conch.*, **4**:152.

1868j "Description of a New Genus and Eleven Species of Land Shells Inhabiting Polynesia." *Amer. J. Conch.*, **4**:153–158, pl. 12.

1868k "On the Existence of an Atoll Near the West Coast of America, and Proof of Its Elevation." *Proc. Calif. Acad. Sci.*, **3**:199.

1869a "Descriptions of the Animals of Certain Genera of Auriculidae." *Proc. Zool. Soc. London*, pp. 59–61.

1869b "Monographie de la Famille des Realiea, Pfeiffer." *J. Conchyliologie*, **17**:131–160.

1869c "Liste des Espèces Supposées Appartenir au Genre Assiminea de Leach." *J. Conchyliologie*, **17**:161–167.

1869d "Déscription d'Espèces Nouvelles du Genre *Helicter*, Habitant les Îles Hawaii." *J. Conchyliologie*, **17**:167–176.

1869e "Corrections and Additions to 'Synonymy of Marine Gasteropodae Inhabiting Polynesia'." *Amer. J. Conch.*, **5**:85–87.

1869f "Remarks on Marine Gasteropodae, Inhabiting the West Coast of America; with Descriptions of Two New Species." *Amer. J. Conch.*, **5**:80–84, pl. 8.

1869g "Descriptions of New Species of Marine Gasteropodae Inhabiting Polynesia." *Amer. J. Conch.*, **5**:64–79, pl. 8.

1869h [1870] "On the Classification of the Helicterinae." *Proc. Zool. Soc. London*, pp. 644–652.

1870a "Observations sur les Espèces de Coquilles Terrestres qui Habitent l'Île de Kauai (Îles Hawaii), accompanées de Déscriptions d'Espèces Nouvelles." *J. Conchyliologie*, **18**:87–97.

1870b "Remarks on the Species of *Melania* and *Limnaea* Inhabiting the Hawaiian Islands, with Descriptions of New Species." *Amer. J. Conch.*, **6**:4–7, pl. 3.

1870c "Remarques sur Certaines Espèces de Coquilles Terrestres, Habitant la Polynesie, et Description d'Espèces Nouvelles." *J. Conchyliologie,* **18**:393–403.

1870d [1871] "Remarks on the Genus *Triphoris* (Desh.) with Descriptions on New Species." *Proc. Zool. Soc. London,* pp. 773–777.

1871a "Synonymie de Quelque Genres et Espèces de Coquilles Habitant la Polynesia." *J. Conchyliologie,* **19**:92–97.

1871b "Remarques sur le Genre *Dibaphus* et sur Quelques Espèces de Genre *Conus.*" *J. Conchyliologie,* **19**:98–100.

1871c "Remarques sur Quelques-Unes des Espèces Enumérées par M.G.P. Deshayes, dans son Catalogue des Mollusques de Île de la Réunion." *J. Conchyliologie,* **19**:101–103.

1871d [1872] "Catalogue of the Land-Shells Inhabiting Polynesia, with Remarks on Their Synonymy, Distribution and Variation, and Descriptions of New Genera and Species." *Proc. Zool. Soc. London,* pp. 449–477.

1871e "Descriptions of Nudibranchiate Mollusca, Inhabiting Polynesia." *Amer. J. Conch.,* **6**:299–305, pls. 19–22.

1871f "Descriptions of New Species of Nudibranchiate Mollusca Inhabiting Polynesia, No. 2." *Amer. J. Conch.,* **7**:11–19, pls. 3–9.

1871g "Notes on the Synonymy and Distribution of Marine Gastropoda." *Amer. J. Conch.,* **7**:20–25.

1871h "Descriptions of New Species of Land Shells." *Amer. J. Conch.,* **7**:26, 27, pl. 9.

1872a "Polynesian Chitonidae." *Amer. J. Conch.,* **7**:194, 195.

1872b "Descriptions of Four Species of Land Shells Inhabiting the Papuan Islands." *Amer. J. Conch.,* **7**:196, 197.

1872c "Synonymy of *Patella exarata,* Rve." *Amer. J. Conch.,* **7**:198, 199.

1865 [1867] CARPENTER, P. P. [List of Synonyms of Pease's Names]. *Proc. Zool. Soc. London,* pp. 516–517; 1866, *Amer. J. Conch.,* **2**:379, 380 [reprint].

1866 TRYON, G. W. "Note on Mr. Pease's Species of Polynesian Phaneropnemona." *Amer. J. Conch.,* **2**:82.

1947 PRUVOT-FOL, A. "Les Opisthobranches de W. Harper Pease Révision." *J. Conchyliologie,* **87**:96–114.

1965 KAY, E. A. "Marine Molluscs in the Cuming Collection, British Museum (Natural History) Described by William Harper Pease." *Bull. Brit. Mus. (N.H.), Zool. Suppl.,* **1**:1–92, pls. 1–14.

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NOTES ON PHILIPPINE BIRDS (No. 4)

Additions and Corrections to *Philippine Birds*

John E. duPont

INTRODUCTION

Since the publication of *Philippine Birds* in 1971, I have found several errors and omissions, and others have been brought to my attention by colleagues. Recent publications have included data that necessitate emendations in the text. All of these corrections and emendations are given in this present paper in the table labeled "Changes to be Made." Under "Forms Omitted" are listed three forms recorded from the Philippines prior to 1971 but overlooked in the writing of *Philippine Birds.* Six forms recorded from the Philippines subsequent to 1971 are listed as "Birds Newly Recorded in the Philippines." Next come three descriptions of new subspecies uncovered in my own recent research. Following these is a list of Philippine subspecies of birds described since the publication of *Philippine Birds,* including, for completeness, the three described in the present paper. Then follows an annotated list of "Recent Publications," which lists papers affecting Philippine ornithology that were published after *Philippine Birds.* Finally, there is a "Bibliography" of additional literature cited in the present paper.

Acknowledgments

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CHANGES TO BE MADE

Original Text Page	Change
1	*Puffinus leucomelas:* Change "upperparts white" to underparts white.
4	*Sula leucogaster plotus:* Change "Foster" to Forster (two places).
18	Change *Butorides striatus "javensis"* to *Butorides striatus javanicus.*
20	Change *Egretta garzetta "nigripes"* (Temminck, 1840) to *Egretta garzetta garzetta* (Linnaeus, 1766). See Parkes (1973:14).
32	Plate 8B: The Garganey Teal illustrated is female, not "male."
36, 38	Change "Asiatic" Honey Buzzard to Common Honey Buzzard.
39	Change *"Haliastus" indus intermedius* to *Haliastur indus intermedius.*
40	Change *"Haliastus" indus* to *Haliastur indus.*
42	*Spilornis holospilus: S. cheela palawanensis* is not a synonym of *holospilus* and is probably in a different species. See Amadon (1974:162).
42	*Circus aeruginosus spilonotus:* Change "wing 345" to wing 395.
65	Plate 16: Reverse letters C and D.
90	Change *Tringa "ochrophus"* to *Tringa ochropus.*
90	Change *Arenaria "interpes"* to *Arenaria interpres.*
92	Change *Tringa "ochrophus"* to *Tringa ochropus* and, in the original synonymy citation, change 1758 *Tringa ochrophus* Linné to read as follows: 1758 *Tringa Ochrophus* [= error for *Ochropus*] Linné.
93	Change *Tringa "incanas" brevipes* to *Tringa incana brevipes.*
93	Change *Arenaria "interpes interpes"* to *Arenaria interpres interpres* and, in the original synonymy citation, change 1758 *Tringa "interpes"* to 1758 *Tringa interpres.*
98, 100	Change "Little Stint" to Eastern Little Stint.
98, 100	Change "Least Sandpiper" to Long-toed Stint.
105	In the range of *Chlidonias hybrida fluviatilis,* after Luzon add the following: (once); a straggler from Australia.
110	*Sterna hirundo longipennis:* Change Soft Parts to read as follows: Bill and feet black (paler in immatures); . . . .
111	*Sterna dougallii bangsi:* The Soft Parts bill color should read as follows: Bill black, red at base during breeding season; . . . .
118	*Phapitreron leucotis leucotis:* Delete 1930 *Phapitreron amethystina polillensis* Hachisuka from the synonymy citation.
119	*Phapitreron amethystina amethystina:* The 1930 synonymy citation should read as follows: . . . Orn. Soc. Japan, suppl. 14:145, (Polillo)

CHANGES TO BE MADE (Continued)

Original Text Page	Change
133	*Geopelia striata striata:* It is questionable whether this species was "introduced."
147	Plate 34: Reverse letters D and E.
174	*Bubo philippensis mindanensis:* In the original synonymy citation, change *Pseudoptynx "philippensis"* to *Pseudoptynx mindanensis.*
188	Change *Cypsiurus "parvus" pallidior* to *Cypsiurus balasiensis pallidior.* See Brooke (1972:218-219 and 1974:127-128).
192	Change *Cypsiurus "parvus"* to *Cypsiurus balasiensis.*
193	Plate 42: Reverse letters A and C.
201	*Halcyon coromanda major:* In the original synonymy citation, change *Alcedo (Halcyon) coromanda "minor"* to *Alcedo (Halcyon) coromanda major.*
201	Delete *Halcyon coromanda minor.* See "Recently Described Birds" for replacements.
215	Plate 47E: The naked skin of the face should be white, not red as shown.
216	Change "Three-toed Woodpecker" to Common Gold-backed Woodpecker.
217	Change "White-bellied Black Woodpecker" to Oriental Black Woodpecker.
218	Change *Dryocopus javensis "estholterus"* to *Dryocopus javensis esthloterus* (two places).
219	Change "Pygmy Woodpecker" to Philippine Pygmy Woodpecker.
232	*Riparia riparia ijimae:* Change the Range to read as follows: Calayan and Palawan; a winter visitor from eastern Asia.
258	In the family name, change "Creepers" to Philippine Creepers.
271	Plate 56: Reverse letters D and E.
285	*Hypsipetes everetti samarensis* is a synonym of *H. e. everetti.* See Parkes (1973:54).
295	Add to the synonymy of *Copsychus luzoniensis superciliaris* as follows: 1896 *Cittocincla nigrorum* Ogilvie-Grant, Ibis, p. 547, (vicinity of Canloan Volcano, Negros)
295	In the synonymy of *Copsychus luzoniensis superciliaris,* delete "Negros, Ticao."
321	The range of *Orthotomus derbianus* should read central and southern Luzon and Catanduanes, not "central and southern Catanduanes and Luzon."
323	Plate 68: Reverse letters B and C.
347	Delete *Culicicapa ceylonensis ceylonensis.* See Parkes (1971:40).

CHANGES TO BE MADE (Continued)

Original Text Page	Change
355	In the family name, change "Pipits" to Wagtails and Pipits.
360	In the family name, change "Wood-swallows" to Woodswallows.
360, 362	Change White-breasted "Wood-swallow" to White-breasted Woodswallow.
360	Change *Lanius cristatus lucionensis* Linnaeus, "1776" to *Lanius cristatus lucionensis* Linnaeus, 1766.
360	In the original synonymy citation, change "1776" *Lanius Lucionensis* to 1766 *Lanius Lucionensis.*
373	*Anthreptes malacensis griseigularis:* In the original synonymy citation, the type locality should read Surigao, not "Suriago."
375	*Nectarinia jugularis jugularis:* In the original synonymy citation, change "1908" to 1909.
384	Change *Arachnothera longirostra "dilutor"* to *Arachnothera longirostra dilutior* (two places).
391	Plate 80: Reverse letters C and F.
391	Plate 80: Reverse letters D and G.
393	Plate 81: Reverse letters E and F.
422	In the Bibliography entry for Deignan, 1961, change "Proc." U. S. Nat. Mus. to Bull. U. S. Nat. Mus.
423	The bibliographic entries for "Grant, O. W. R." and "Grant, O. W. R., and J. Whitehead" should be deleted on this page. They should be changed to read Ogilvie-Grant, W. R., and J. Whitehead; and they should be inserted at the bottom of page 428.

FORMS OMITTED

***Columba vitiensis anthracinus* (Hachisuka, 1939)**

1939 *Janthoenas vitiensis anthracinus* Hachisuka, Bull. Brit. Orn. Cl., **59**:152, (Lumbucan Island, Palawan)

RANGE: Known only from type locality.

I agree with Ripley (1958:192) that this population is distinct. Specimens now in DMNH.

Enter after *C. v. griseogularis* on p. 131.

***Erithacus cyane bochaiensis* (Shulpin, 1928)** **Siberian Blue Robin**

1928 *Larvivora cyane bochaiensis* Shulpin, Annuaire Mus. Zool. Acad. Sci., U.R.S.S., 28:404, (Fansa Station, Suchan Railroad, southern Ussuriland)

RANGE: Winter visitor from Asia, recorded from Mindanao, Bongao, and Sanga Sanga.

First Philippine record was a female collected at Zamboanga, Mindanao, February 24, 1898, (AMNH)–the basis for the mention by Vaurie (1959:387). Two additional specimens were collected on Bongao and Sanga Sanga, Sulu Archipelago, in 1971 (duPont and Rabor, 1973a:49).

Enter after *E. calliope* on p. 294.

***Phylloscopus ijimae* (Stejneger, 1892)** **Ijima's Willow Warbler**

1892 *Acanthopneuste ijimae* Stejneger, Proc. U. S. Nat. Mus., **15**:372, (Miyakejima, Izu Ids.)

RANGE: Winter visitor from Japan. Six specimens collected in Luzon in December and one in Samar in April (Gilliard, 1950:496).

Enter after *P. cebuensis sorsogonensis* on p. 320.

BIRDS NEWLY RECORDED IN THE PHILIPPINES

***Gallinula chloropus indica* Blyth, 1842**

Recorded from: Luzon (McClure, 1974:131)
Add on p. 75 after *G. c. lozanoi*

***Charadrius alexandrinus alexandrinus* Linnaeus, 1758**

Recorded from: Luzon (McClure, 1974:139)
Negros (Parkes, *in litt.*)
Add on p. 79 after *C. a. dealbatus*

***Himantopus himantopus himantopus* (Linné, 1758)**

Recorded from: Mindoro (Temme, 1973e)
Add on p. 102 after *H. h. leucocephalus*

***Sterna fuscata serrata* Wagler, 1830**

Recorded from: Leyte (Parkes, 1973:26)
Add on p. 111 after *S. f. nubilosa*

***Caprimulgus macrurus salvadorii* Sharpe, 1875**

Recorded from: Bongao (duPont and Rabor, 1973a:39)
Add on p. 179 after *C. m. delacouri*

***Hemiprocne longipennis harterti* Stresemann, 1913**

Recorded from: Sibutu (duPont and Rabor, 1973a:40)
Add on p. 189 after *H. comata major*

DESCRIPTIONS OF NEW FORMS

***Turnix sylvatica* Desfontaines, 1787**

Specimens recently examined from Negros show that there is an undescribed race there; it may be called:

Turnix sylvatica nigrorum **new subspecies**

Type FMNH 227921, ♀ Umod, Sta. Catalina, Negros, Philippines, Dec. 22, 1955. Wing 69; tail 18; bill 13; tarsus 18.

DIAGNOSIS: Differs from *T. s. whiteheadi* from Luzon by having the black feathers of the crown with dark brown edges; nuchal collar darker chestnut; back blacker in general, with brown bands darker than in *whiteheadi* and black bands wider than in *masaaki* of Mindanao. Underparts similar to *whiteheadi* but paler than *masaaki;* spots on sides of breast differ from *masaaki* and *celestinoi* of Bohol by being round rather than lateral bars; differs from *whiteheadi* by having the spots larger, rounder, and less V shaped. Spots closer to the center of the breast are black; the lateral spots are chestnut with black margins. Wing-coverts differ by having the spots less linear and more half-circle than those of *whiteheadi;* the wing spots of *masaaki* are transverse black bars. Male—similar to male of *whiteheadi,* with the difference of the spotting on the sides of the breast similar to that in the female. Generally, *nigrorum* is intermediate between *whiteheadi* and *masaaki.*

RANGE: Negros

SPECIMENS EXAMINED: *whiteheadi*—Luzon 14♂, 16♀; *nigrorum*—Negros 1♂, 1♀; *masaaki*—Mindanao 1♀.

ETYMOLOGY: This new subspecies is named for the island that it inhabits.

Halcyon hombroni **(Bonaparte, 1850)**

Specimens recently examined from Mindanao show that there is an undescribed race on the eastern side; it may be called:

Halcyon hombroni burtoni **new subspecies**

Type DMNH 19970, ♂ Balangbalang, Cabadbaran, Mt. Hilong-Hilong, Agusan, Mindanao, Philippines, April 5, 1963. Wing 117; tail 92; bill 48; tarsus 17.

DIAGNOSIS: Differs from the nominate race, from the Zamboanga Peninsula, by having the chin and throat light rufous, not white; underparts generally darker; chestnut of the cheeks and ear-coverts darker and lacks the straw-colored shaft streaks found in the western population.

RANGE: Eastern Mindanao from Mt. Hilong-Hilong south to Surigao del Sur and west to Mt. Apo. Lowland specimens from Davao and Mt. Apo seem to be intermediate. The nominate race is found on the Zamboanga Peninsula, east to Cotabato.

SPECIMENS EXAMINED: *hombroni*—27♂, 20♀; *burtoni*—9♂, 5♀.

ETYMOLOGY: This new subspecies is named for Philip J. K. Burton of the British Museum (Natural History).

REMARKS: Three specimens of *hombroni* in the British Museum (Natural History) are labeled "Basilan," an island from which the species is otherwise unrecorded. However, one of these still carries the original field label of William Doherty bearing "Ayala," which is a Mindanao locality on the coast of the Zamboanga Peninsula. Most of the specimens taken by Doherty in the Philippines were, indeed, from Basilan; so somebody apparently assumed that this was also true of the series of *Halcyon hombroni.*

Copsychus luzoniensis

This endemic Philippine species has been recorded from eight islands and has not been critically studied by any recent author. In reviewing the species with the aid of recently received specimens, I have reevaluated the characters used to define the three previously recognized subspecies, and a fourth subspecies is here described.

Copsychus luzoniensis luzoniensis (Kittlitz, 1832)

There is a slight although noticeable variation within this subspecies on the island of Luzon. Females from northern Luzon have the ear-coverts averaging blacker and blending with the throat, whereas the females from southern Luzon tend to have the ear-coverts browner, tending to contrast with the gray of the throat. Males do not appear to vary within Luzon. In view of the slight and not wholly consistent nature of the variation observed, no nomenclatural recognition appears warranted.

RANGE: Luzon.

Copsychus luzoniensis subsp.

A single male from Catanduanes (AMNH 580277) has an even darker chestnut rump than do specimens of *parvimaculata* from Polillo and has less white at the tips of the rectrices than either Luzon or Polillo birds. Until additional material can be examined, the Catanduanes population cannot be definitely allocated.

Copsychus luzoniensis parvimaculata (McGregor, 1910)

This race differs from *C. l. luzoniensis* by having smaller white tips to the rectrices. In addition, the rump in the male is darker chestnut, a character that has been previously overlooked.

RANGE: Polillo.

Copsychus luzoniensis shemleyi new subspecies

Type DMNH 11229, adult ♀, collected at Matabang Bundok, Kilo-Kilo, Santa Cruz, Marinduque Island, P.I. Wing 74; tail 71; bill 16; tarsus 26.

DIAGNOSIS: The one available female from Marinduque differs from *C. l. luzoniensis* (the race to which Marinduque birds are assigned in the literature) by having the throat white rather than some shade of gray. In this the Marinduque female resembles those of *C. l. superciliaris,* but in the latter race the white throat is bordered posteriorly by a black band, whereas in *shemleyi* this band is gray. In further contrast with Luzon birds, the white wing patch of *shemleyi* is reduced and the rump is darker chestnut. In males, too, the rump is slightly darker and the white tips of the rectrices are somewhat larger than in *luzoniensis.*

RANGE: Marinduque.

ETYMOLOGY: This new subspecies is named for Mr. Lawrence P. Shemley, my pilot, friend, and able assistant.

Copsychus luzoniensis superciliaris **(Bourns and Worcester, 1894)**

The describers considered this form to differ from *C. l. luzoniensis* only by having a more prominent superciliary stripe. Ogilvie-Grant (1896), without having seen Masbate topotypes of *superciliaris,* described the Negros population as *Cittocincla nigrorum,* sp. n. and stated that its eyebrow stripes were no wider than those of *luzoniensis,* which should serve to separate his new form from *superciliaris.* McGregor (1911) was the first to assemble enough material from different islands to be able to show that *nigrorum* was a synonym of *superciliaris* and, further, that the superciliary stripe in *luzoniensis, superciliaris,* and *"nigrorum"* was "practically of the same width." He later (1921) reiterated this point when adding Panay to the known range of *superciliaris.* The specimens examined in the present study confirm the invalidity of the superciliary streak character, as the variation among the large series of Luzon birds examined completely encompasses that shown by *superciliaris.* Furthermore, the apparent width of the superciliary stripe in skins is affected by preparation technique. McGregor (1911) believed that *luzoniensis* differed from *superciliaris* in having the white superciliary stripes connected across the forehead. This is not a consistent character, and many Luzon birds have the superciliary stripes separated by black at the forehead.

Ogilvie-Grant (1896), in describing *"nigrorum,"* mentioned several good characters in which *superciliaris* differs from *luzoniensis* but which had been overlooked by Bourns and Worcester. Although the latter authors mentioned the wholly black upperparts in their original description, they failed to call attention to this as a difference from *luzoniensis,* which has a chestnut rump. Ogilvie-Grant mentioned this point, and also the wholly black wing, lacking the white patch on the greater wing-coverts typical of *luzoniensis.* Ogilvie-Grant further stated that in *"nigrorum"* the rectrices were "uniform black, with the exception of the outer pair, which have a small white spot at the tip." McGregor (1910) stated that an unspecified number of males had the "outer pair of rectrices with narrow white tips, wanting in one specimen." Specimens examined in the present study lacked white on the tail, but if the white tip is as narrow as the wording of the earlier authors suggests, its absence in some of the specimens I examined might be due to wear.

Although in his "Manual" (1910) McGregor correctly synonymized *nigrorum* Ogilvie-Grant with *superciliaris* Bourns and Worcester, he failed to quote the description of the female plumage; this sex was unrepresented in the original series of *superciliaris.* As mentioned by Ogilvie-Grant, the female of *superciliaris* differs strikingly from that of *luzoniensis* in that the throat of the former is pure white bordered posteriorly with a black band, rather than being gray. The throat of the female *shemleyi* is similar, but is bordered with a gray, not a black band. The two female *superciliaris* examined in the present study lacked terminal white spots on the rectrices and, as in males, were uniformly colored dorsally rather than having a contrasting chestnut rump.

Dr. Kenneth C. Parkes, who has been studying the Bourns and Worcester types of Philippine birds, points out that Ripley (1964) erred in giving the type locality of *superciliaris* as "Masbate, Negros, and Ticao Islands," and this error was unfortunately perpetuated in *Philippine Birds.* Bourns and Worcester had only three specimens, all from the island of Masbate. All are now in the USNM; Deignan (1961) wrongly listed only two of the three as cotypes.

SPECIMENS EXAMINED: *luzoniensis*–Luzon 46♂, 20♀; subsp.?–Catanduanes 1♂; *parvimaculata*–Polillo 2♂, 4♀; *shemleyi*–Marinduque 4♂, 1♀; *superciliaris*–Masbate 2♂, 2♀; Negros 2♂; Ticao 6♂; [Panay–none examined].

RECENTLY DESCRIBED BIRDS

Accipiter virgatus quagga **Parkes, 1973**

Nemouria, 11:17, (Mount Katanglad [5000′-5500′], Malaybalay, Bukidnon Province, Mindanao, Philippines)

Add on p. 43 after *A. v. confusus.*

Turnix sylvatica nigrorum **duPont, 1976**

Nemouria, 17:6, (Umod, Sta. Catalina, Negros, Philippines)

Add on p. 58 after *T. s. whiteheadi.*

Ninox philippensis ticaoensis **duPont, 1972**

Nemouria, 6:6, (Sitio Calpi, Danao, San Jacinto, Ticao, P. I.)

Add on p. 174 after *N. p. proxima.*

Halcyon coromanda linae **Hubbard and duPont, 1974**

Nemouria, 13:22, (Iwahig, Palawan, Philippine Islands)

Add on p. 201 after *H. c. bangsi.*

Halcyon coromanda claudiae **Hubbard and duPont, 1974**

Nemouria, 13:22, (Bulubuk, Sanga Sanga Island, Tawi Tawi Group, Sulu Archipelago, Philippine Islands)

Add on p. 201 after *H. c. linae* (see preceding addition).

Halcyon hombroni burtoni **duPont, 1976**

Nemouria, 17:6, (Balangbalang, Cabadbaran, Mt. Hilong-Hilong, Agusan, Mindanao, Philippines)

Add on p. 206 after *H. hombroni.*

Coracina coerulescens deschauenseei **duPont, 1972**

Nemouria, 7:9, (Matabang Bundok, Kilo-Kilo, Sta. Cruz, Marinduque, P. I.)
Add on p. 235 after *C. c. coerulescens.*

Pericrocotus flammeus neglectus **Parkes, 1974**

Ann. Carnegie Mus., **45**:38, (Sitio Balisong, Barrio Kablon, Tupi, Cotabato Province, Mindanao)
Add on p. 244 after *P. f. gonzalesi.*

Rhabdornis inornatus leytensis **Parkes, 1973**

Nemouria, 11:49, (Tambis, Burauen [Mount Lobi range], Leyte, Philippines)
Add on p. 259 after *R. i. inornatus.*

Macronous striaticeps alcasidi **duPont and Rabor, 1973**

Nemouria, 10:76, (Omasdang, Loreto, Surigao del Norte, Dinagat Id., P. I.)
Add on p. 269 after *M. s. mindanensis.*

Copsychus luzoniensis shemleyi **duPont, 1976**

Nemouria, 17:7, (Matabang Bundok, Kilo-Kilo, Sta. Cruz, Marinduque, P. I.)
Add on p. 295 after *C. l. parvimaculata.*

RECENT PUBLICATIONS

Amadon, Dean

1974 Taxonomic notes on the Serpent-eagles of the genus *Spilornis.* Bull. Brit. Orn. Cl., **94**:159-163. [A partial revision of this genus, including clarification of the status of the Philippine forms.]

Brooke, R. K.

1972 Geographical variation in Palm Swifts *Cypsiurus* spp. (Aves: Apodidae). Durban Mus. Novit., **9**:217-231. [Shows that Asian and African Palm Swifts are not conspecific, the former taking the name *Cypsiurus batasiensis.*]

1974 Nomenclatural notes on and the type localities of some taxa in the Apodidae and Hirundinidae (Aves). Durban Mus. Novit., **10**:128-137. [Shows that *balasiensis* rather than *batasiensis* is the correct spelling of the name of the Asian Palm Swift.]

duPont, John E.

1972a Notes on Philippine birds (no. 2): birds of Ticao. Nemouria, 6:1-13. [An ornithological history of Ticao listing recorded species including nine new records and the description of one new subspecies.]

1972b Notes on Philippine birds (no. 3): birds of Marinduque. Nemouria, 7:1-14. [An ornithological history of Marinduque listing recorded species including 16 new records and the description of two new subspecies.]

duPont, John E., and Dioscoro S. Rabor

1973a South Sulu Archipelago birds: an expedition report. Nemouria, 9:1–63. [An expedition report with field notes listing the species found: 32 new records including two new species records for the Philippines.]

1973b Birds of Dinagat and Siargao, Philippines: an expedition report. Nemouria, 10:1-111. [An expedition report with field notes listing the species found: 69 new records for Dinagat and 65 for Siargao. One new subspecies described.]

Hubbard, John P., and John E. duPont

1974 A revision of the Ruddy Kingfisher, *Halcyon coromanda* (Latham). Nemouria, 13:1-29. [A species revision with the description of two new subspecies from the Philippines.]

Lovejoy, Thomas E.

1973 The Blue-eyed Eagle of the Philippines. Frontiers, **38**:2-7. [A study of the Monkey-eating Eagle and its plight due to loss of habitat.]

McClure, H. Elliott

1974 Migration and survival of the birds of Asia. Bangkok, Thailand: U. S. Army Medical Component, SEATO Medical Project. 476 pp. [A report of bird banding studies in southeast Asia. Four new island records and two new subspecies records for the Philippines.]

Myres, M. T., and R. F. Apps

1973 Migration of birds over the south coast of China recorded by radar. Nature, **241**:552-553. [A flock of birds recorded from the southern Philippines (Palawan) or from northern Borneo to the mainland of China; duration of nonstop flight, 36-48 hrs.]

Parkes, Kenneth C.

1973 Annotated list of the birds of Leyte Island, Philippines. Nemouria, 11:1-73. [An ornithological history and check-list of the birds of Leyte; 25 new island records and the description of two new subspecies, one of which is from Mindanao.]

1974 Geographic variation in the Flame Minivet (*Pericrocotus flammeus*) on the island of Mindanao, Philippines (Aves: Campephagidae). Ann. Carnegie Mus., **45**:35-41. [A discussion of this species with the description of one new subspecies from Mindanao.]

Prescott, Kenneth W.

1973 First report of *Pitta e. erythrogaster* from Leyte. Bull. Brit. Orn. Cl., **93**:32-33. [A record incorporated in Parkes, 1973.]

(Anonymous)

1971 Recovery round-up. Australian Bird Bander, **9**:89. [Wedge-tailed Shearwater (*Puffinus pacificus*) banded on North Solitary Island,

N.S.W., on Dec. 2, 1960, recovered at Cagayan, Mindanao, on July 23, 1971, a flight of 3250 miles NW, the longest movement recorded for this species. A new island record for Mindanao.]

Temme, Manfred

1973a A White Ibis (*Threskiornis aethiopica melanocephala*) on Mindoro, Philippine Island. Ornith. Mitt., **25**:32. [A new island record for Mindoro; this rare straggler to the Philippines has been recorded only from Luzon.]

1973b Notizen über die Graseule (*Tyto capensis*) (=*Tyto longimembris*) auf der philippinischen Insel Mindoro. Ornith. Mitt., **25**:80-82. [A new island and breeding record for Mindoro; also a discussion of food as determined by a study of pellets (1970-1971).]

1973c Zur Häufigkeit von *Chlidonias leucopterus* auf den Philippinen. Ornith. Mitt., **25**:263-266. [Two new island records (Luzon and Mindoro) for the White-winged Black Tern, with a map and locality records.]

1973d Einige Beobachtungen am Grau-Mennigvogel (*Pericrocotus divaricatus*) auf der philippinischen Insel Mindoro. Ornith. Mitt., **25**:266-269. [A discussion of the wintering population of the Ashy Minivet on Mindoro.]

1973e Zum Vorkommen des Stelzenläufers *Himantopus h. himantopus* in den Philippinen. Journ. f. Orn., **114**:504-507. [A new wintering subspecies record of the White-headed Stilt for the Philippines from the island of Mindoro.]

White, C. M. N.

1974 The Little Egret *Egretta garzetta* in Wallacea. Bull. Brit. Orn. Cl., **94**:78-79. [Places the remarks on this species of Parkes (1973) in the context of islands surrounding the Philippines.]

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1896 On the birds of the Philippine Islands, part VIII; the highlands of Negros. Ibis, pp. 525-565.

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GEOGRAPHIC VARIATION IN THE COMMON TODY-FLYCATCHER (*TODIROSTRUM CINEREUM*), WITH SPECIAL REFERENCE TO MIDDLE AMERICA

*Kenneth C. Parkes**

This paper is dedicated to Dr. Alexander Wetmore, on the occasion of his ninetieth birthday, 18 June 1976.

Since the description of *Todirostrum cinereum finitimum* by Bangs in 1904, this name has been used universally for the Common Tody-Flycatchers of the Middle American portion of the species' range, from southern México through Panamá. A few authors have commented on the variability of specimens from within this range. Ridgway (1907:365) stated: "After very careful examination and comparison of a series of 108 adults of this species, I am not able to confirm all the characters of this form [*finitimum*] as given by Mr. Bangs, especially the alleged differences in intensity of the yellow on the underparts, which to me seems, if any different, brighter in South American than in Mexican and Central American skins, instead of the reverse. The difference in coloration of the upper parts is also by no means constant, but there seems to be an average difference sufficient to separate the two series." Most recently, Wetmore (1972:522) wrote: "The subspecies *finitimum* in its typical form, in México and northern Central America, differs in being more greenish above, as compared to the grayer nominate *cinereum* of northern South America. The population of Panamá is slightly intermediate, but on the whole is nearer *finitimum* in somewhat greenish dorsal hue, though many are faintly paler than typical individuals from México. The long series examined shows too much variation to warrant another name."

Early authors, such as Ridgway, were handicapped in their evaluation of geographic and individual variation in color in this species because they were not aware of its sexual dimorphism: Ridgway (1907:364) stated simply "sexes alike." Wetmore (1972:520) gave a detailed description of the plumage colors of males, and then correctly stated "Adult female similar, but usually with loral and frontal area with more tipping of yellowish white (this found also in some

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males), and dorsal surface often paler, more grayish green." He went on to describe the perishable "soft part" colors of one male and one female specimen. The bills of these two he described as follows: male, "extreme tip of maxilla, lower half of mandibular rami, a line on the gonys, and tip of mandible ivory-white; rest of bill black." Female, "maxilla black; mandible dull white with a faint grayish tinge." This sexual dimorphism in mandible color is so consistent in adults of most races of this species that I have had no hesitation in considering the few pale-billed "♂" or black-billed "♀" specimens as having been missexed. The material of *T. c. peruanum* Zimmer in the American Museum of Natural History suggests that, in this race alone, both sexes have black mandibles. Dickey and van Rossem (1938:389) called attention to sexual dimorphism in bill color in *T. c. finitimum,* but believed that it also held true in juveniles; specimens I have examined suggest that bill color is *not* reliable for external sexing of young specimens. Dickey and van Rossem also overlooked the difference between the sexes in back color, correctly described by Wetmore, but instead stressed the greater posterior extension of the black crown color of males. This is a valid but somewhat variable character.

It is true that there is individual variation in dorsal color in this species, and color changes are produced with feather wear as well. However, when fresh specimens are examined in series, it becomes obvious that there is geographic variation within the Middle American range currently assigned to *finitimum*. Part of the difficulty previous authors have had in assessing this variation undoubtedly lies in the assumption that "Mexican" specimens can be considered topotypical and compared with specimens from elsewhere. As will be shown, the Common Tody-Flycatchers of México by no means represent a homogeneous population.

Both Ridgway (1907:364) and Wetmore (1972:522) mentioned the slightly larger size of South American as compared with Middle American specimens. Measurements *among* Middle American samples show only one definite geographically correlated trend, to be discussed later. Color of underparts, as already suggested by Ridgway, is virtually useless as a taxonomic character. I have relied entirely on the color of the upperparts (crown, dorsum, wing) in making my detailed comparisons.

In México this species is, in general, a bird of coastal lowlands. On the Caribbean side it extends northwest to the vicinity of the Río Papaloapan, Veracruz; if it goes beyond this area, I have not seen the records, nor are any known to Allan R. Phillips (*in litt.*). I have already commented (Parkes, 1970:93) on the status of the species on the Yucatán Peninsula. At that time I knew of no authentic record from the state of Yucatán earlier than a sight record at Sisal by Dale A. Zimmerman, 9 May 1956. I overlooked a specimen in the National Museum of Natural History (USNM 213146) taken by Gaumer at Progreso in October 1884 (Gaumer's specimens *with full data* are generally reliable; see comments in Parkes, 1970) and another from Progreso in the Museum of Zoology, University of Michigan, collected by Van Tyne and Trautman on 14 May 1938. Paynter (1955:201) also overlooked these Yucatán specimens, listing this species as known from the Peninsula only from one locality in Campeche and four in Quintana Roo. It is possible that the status of this tody-flycatcher has changed in coastal Yucatán, as it has been seen and collected so frequently during the past two decades that it is difficult to understand how earlier observers could have missed it.

On the Pacific side of México, *Todirostrum cinereum* appears to be confined to the narrow coastal strip of the state of Chiapas. Beyond México it was stated by Land (1970:230) to be common in the Pacific lowlands of Guatemala and fairly common in the Caribbean lowlands and Petén district of that country, common in cleared and open areas of British Honduras (Russell, 1964:126), common below 1500 feet in El Salvador (Dickey and van Rossem, 1938:388), common in the Caribbean lowlands and uncommon in the interior and in the Pacific lowlands of Honduras (Monroe, 1968:273), and common in nonforested areas throughout most of Costa Rica (but not above the subtropical belt) (Slud, 1964:264). In Panamá, Wetmore (1972:520-521) considered this species "common in open, bushy areas in the Tropical Zone" and also "not abundant . . . [but] widely distributed so that they are seen regularly, mostly in pairs." Wetmore's distributional account suggests a hiatus in the range of this species in eastern Panamá, but this may be an artifact of collecting–the open or second-growth habitat preferred by this species is probably sparse in the relatively little-known eastern part of the country. Distribution within Panamá will be further discussed later in the present paper.

Although, as indicated earlier, this species is indeed rather individually variable in color, sex for sex, and severe wear obscures differences in back color, nevertheless the abundant material in adequate plumage condition available by pooling museum series has permitted the discrimination of three subspecies dividing up the range presently assigned to *T. c. finitimum.* Color differences are better marked among females, so specimens of this sex have been chosen as holotypes of the two new races.

Todirostrum cinereum virididorsale new subspecies

Holotype DMNH 54678, ♀ just completing 1st prebasic molt, collected 3–4 miles ENE of Tlacotalpan, Veracruz, México, on 24 September 1961, by Robert W. Dickerman; prepared by Allan R. Phillips (orig. no. ARP 5981).

DIAGNOSIS: Differs from *T. c. finitimum* Bangs in the much brighter, greener, less gray color of the back in both sexes but especially in females; crown in females more uniformly black, with little or no contrasting gray nuchal area and individual feathers of crown more uniform (in that they lack contrasting gray edgings in fresh condition); dorsal color nearest the geographically distant *T. c.*

coloreum Ridgway of Matto Grosso, Brazil, and adjacent eastern Bolivia, but crown blacker and size much smaller than in that subspecies. There is no significant difference in wing or bill length between *viridorsale* and *finitimum.*

RANGE: Known only from the drainage of the Río Papaloapan, in south-central Veracruz and adjacent northernmost Oaxaca, México.

ETYMOLOGY: From Latin *viridis,* "green," and *dorsalis,* "of the back," with reference to the most distinctive character of this race.

SPECIMENS EXAMINED: **México,** *Veracruz*—vicinity of Tlacotalpan 8, Tres Zapotes 2, Carlos A. Carrillo (formerly San Cristobal) 1; *Oaxaca*—Loma Bonita 2 (the record from San Miguel Soyaltepec listed by Miller et al. [1957:98] undoubtedly belongs here).

Todirostrum cinereum finitimum Bangs

Proc. Biol. Soc. Wash., **17**:114, 1904 (San Juan Bautista = Villahermosa, Tabasco, México).

DIAGNOSIS: Dorsal color of females variable, greenish gray to grayish green, but never the bright green of *viridorsale;* dorsal color of males darker and grayer, often with very little green element visible, so that the dorsal color appears almost continuous with the dark gray of the nape (the dorsal color of *finitimum* is actually nearest that of *T. c. cinereum* [Linnaeus] of South America, but the latter is usually darker, grayer, and more uniformly colored, with less tendency toward a brightening and greening in the rump area); shiny black area of anterior part of crown more restricted. The black feathers of the anterior half of the crown of females are edged with gray, especially posteriorly, so that this part of the crown appears in good light to be streaked. This pale edge is less resistant to wear than is the black center of the feather, so that worn females still have a streaked-crowned appearance, as the formerly pale-edged feathers wear narrower than the all-black crown feathers of *viridorsale.* This streaked-crowned appearance is visible in a few males, but in this sex the entire crown is usually black.

RANGE: From southern Veracruz through all of Central America, including the Yucatán Peninsula, to Costa Rica, on the Caribbean side, and north to Chiapas on the Pacific side; confined chiefly to coastal lowlands at the northern end of the range, but more widely distributed farther south. Intergrades in Costa Rica with the Panamanian race described later in this paper.

REMARKS: The restricted range of *Todirostrum cinereum viridorsale* is to some extent cut off from that of *T. c. finitimum* by the highlands of the Sierra de Tuxtla, Veracruz, although it is quite possible that the ranges of the two subspecies meet somewhere south or southwest (= inland) of these coastal mountains (see map in Wetmore, 1943:217). I have seen only one specimen from the eastern lowlands of Veracruz, between the Sierra de Tuxtla and the Tabasco border. This specimen (UMMZ 100231) is a female from Minatitlán and is clearly referable to *finitimum.* The population of the Pacific coastal lowlands of

Chiapas is completely isolated by highlands from other Mexican populations of the species but is inseparable from *finitimum* in color. This isolation does manifest itself in larger size, however—the only definitely geographically correlated size variation found in Middle American populations. Both in wing (flat) and bill (from forehead) length, the Chiapas birds are significantly larger, although not at a subspecific level of separability. For five Chiapas ♂♂, wing $\overline{x}$ = 44.3 mm., S.D. 0.67. For eight *finitimum* ♂♂ from Mexico, British Honduras, and Honduras, wing $\overline{x}$ = 43.4 mm., S.D. 0.51. For these two samples, Student's t = 2.756, $P < .02$. Bill differences are somewhat greater than wing: five Chiapas ♂♂, bill $\overline{x}$ = 16.0 mm., S.D. 0.42. For eight *finitimum,* bill $\overline{x}$ = 15.3 mm., S.D. 0.57. For these two bill samples, t = 3.215, $P < .01$.

This Chiapas population is geographically continuous with that of Pacific Guatemala. According to Land's map (1970:230), the central highlands create a divided range for this species in Guatemala as in Chiapas. I have examined only two specimens from Pacific Guatemala (AMNH 399195, 399196); these match the largest Chiapas specimens in wing length, but have even longer bills: ♂ 18 mm. (longest Chiapas = 16 mm.), ♀ 17.5 mm. (longest Chiapas = 15.9 mm.). For the present, these Pacific birds are best kept in *finitimum.*

SPECIMENS EXAMINED: **México**, *Veracruz*—Minatitlán 1; *Tabasco*—Frontera 3, San Juan Bautista (= Villahermosa) 2 (paratypes), La Venta 2, Teapa 1, Montecristo 1 (plus additional Tabasco specimens, not individually listed, seen at Louisiana State University); *Yucatán*—Progreso 2, Chelem 2, Chicxulub Puerto 1, unspecified 1; *Quintana Roo*—Vigia Chico 4; *Chiapas*—Pijijiapan 5, Escuintla 3, Huehuetan 1, 44 km. N Mapastepec 1, Palenque 1. **Guatemala,** *Petén*—various localities 6; *Escuintla*—Pantaleón 1, San José 1. **British Honduras** (= Belize)—All Pines 4, Freetown 3, Toledo District 1. **Honduras**—La Ceiba 4, Río Segovia 3, Coyoles 2, San Esteban 2, Lake Yojoa 1, Trujillo 1. **Nicaragua**—Greytown 3, Sucuya 1, Los Sabalos 1. **Costa Rica**—see under next subspecies.

Todirostrum cinereum wetmorei new subspecies

Holotype USNM 460905, adult ♀, collected at San Félix, Chiriqui, Panamá, on 13 February 1956, by Alexander Wetmore (orig. no. 20608).

DIAGNOSIS: Dorsal color nearer to *T. c. virididorsale* than to the adjacent *T. c. finitimum,* but distinctly darker, less yellowish green, sex for sex; greener than the dark grayish *finitimum;* crown streaking as in *finitimum.*

RANGE: Panamá and much of Costa Rica. Most specimens from central and eastern Costa Rica are nearest to *wetmorei,* whereas those of northwestern Costa Rica are nearer *finitimum.* Interestingly, the transition in females is much more abrupt than in males, with almost all Costa Rican females except those from Guanacaste being much closer to *wetmorei,* whereas the Costa Rican males as a group are variable intermediates. I have therefore not tried to segregate Costa

Rican specimens by subspecies names and intergrades, but list them all later under the SPECIMENS EXAMINED heading for *wetmorei.*

ETYMOLOGY: Named for Dr. Alexander Wetmore of the Smithsonian Institution, the greatest American ornithologist of the twentieth century, authority on the birds of Panamá, and a friend and mentor to hundreds of younger colleagues.

REMARKS: The series of *wetmorei,* like all other series of this species, is somewhat individually variable in color, with females being more consistent than males. There is no indication of any cline from western to eastern Panamá. The two Darién specimens examined cannot be separated from the rest of the Panamanian series and do not approach *cinereum* of adjacent South America. Furthermore, birds from the Río Atrato, in Colombia adjacent to Panamá, do not approach *wetmorei* (contrary to the statement of Chapman [1917:437-438]); in fact, one specimen (CM 64401) from Quibdó on the upper Atrato is virtually as blackish above as the extremes among all South American *T. c. cinereum* examined.

SPECIMENS EXAMINED: A long series of Panamá specimens in USNM were looked over; those listed were used for detailed comparisons as being in good plumage, or as to fill in locality gaps. **Panamá,** *Bocas Del Toro*–Almirante 6, Cocoplum 3; *Chiriquí*–El Volcan 5, Boquerón 3, San Félix 2, Alanje 1, Boquete 1, Cerro Flores 1, Puerto Armuelles 1, Sereno 1; *Veraguas*–Isla Coiba 2, Chitrá 1, Isla Cebaco 1, Isla Gobernadora 1, 15 miles SE Santiago 1, Soná 1; *Herrera*–El Rincón 1; *Los Santos*–Los Santos 1; *Coclé*–Aguadulce 2, El Potrero 1; *Colón*–Chilar 2; *Panamá*–Chico 3, Savanna near Panamá 2, Candelaría 1, La Chorrera 1, Pacora 1; *Canal Zone*–Gatún 2, Fort Clayton 1, Juan Mina 1; *San Blas*–Mandinga 1; *Darién*–Boca de Cupe 1, Cana 1. **Costa Rica,** *Limón*–Guápiles 11, Guácimo 2, Río Reventazón 2, El Hogar 1, Jiménez 1; *Guanacaste*–Guayabo 3, Miravalles 2, Zapotal 1; *Puntarenas*–Buenos Aires 2, Bonilla 1, Orotina 1, Pigres 1; *San José*–Carrillo 2, San José 1; *Cartago*–Aquiares 2, Juan Viñas 2, Pacuare 1.

NOTES ON SOUTH AMERICAN POPULATIONS

A not uncommon variation in this species is the presence of one or more white feathers in the black crown area. This variation appears to be independent of age or sex and may appear anywhere in the range of the species–I have seen it in *virididorsale* from Veracruz and in *coloreum* from Bolivia, as well as from various intermediate localities. In the series of the species now before me, this variation occurs most frequently in specimens from north-central Venezuela (states of Carabobo, Aragua, Miranda, and the Distrito Federal): of 37 specimens from this region, 13, or 35.1 per cent, exhibit one or more crown spots, whereas in the total series of 142 from the rest of the range of the species, only 15, or 10.6 per cent, have crown spots. The high frequency of white crown spots in this northern Venezuela sample suggests affinity with the highly distinctive form *viridanum* of the westernmost coastal areas of Venezuela, in the states of Zulia and Falcón. This form, described by Hellmayr (1927:301) as a full species, is differentiated from the adjacent *T. c. cinereum* by several characters, one of which is "some of the feathers on the anterior crown spotted with creamy white." Rodolphe Meyer deSchauensee (1966:363) and other recent authors have placed *viridanum* as a subspecies of *cinereum.*

The nominate race, according to current concepts, occupies tropical and lower subtropical areas of suitable habitat in Colombia (except southernmost), Venezuela (other than in the small range of *T. c. viridanum*), the Guianas, and northern Brazil. There is some geographically correlated variation within this area, but I have not yet been able to define any pattern that would make geographic sense. At the north end of Lake Maracaibo, Venezuela, and extending along the coast of the state of Falcón, lies the range of the pale, strikingly marked race *viridanum* Hellmayr. Nearby, between the southern end of Lake Maracaibo and the Mérida mountains, there is apparently a center of differentiation in the exact opposite extreme of color. In a small series in Carnegie Museum of Natural History (CM) from the western foothills of the Mérida mountains, in west-central Estado Mérida, both sexes are much sootier above than typical *T. c. cinereum* from the Guianas, with *no* greenish tones whatsoever on the dorsum except on the upper tail-coverts. In addition, the shiny black (anterior) portion of the crown extends farther caudad and is more glossy than in most other *cinereum.* The tiny feathers between the forehead and the nostril that are yellow in most females and some males of this species are, in the Mérida birds, black with little or no yellow.

I have refrained from naming this Mérida population for two reasons: first, more specimens from adjacent areas must be examined to see how far this tendency to blackness extends; and second, the nearest approach to the characters of the Mérida birds among the South American specimens I have examined is found in two series from Chocó, in northwesternmost Colombia (CM, ANSP). This area is separated from Mérida by much of the Colombian range of the species, from which the available specimens are indistinguishable from Guianan *cinereum.* It is obvious that a reexamination of variation in *Todirostrum cinereum* in northern South America is warranted.

SUMMARY

"Individual variation" in *Todirostrum cinereum finitimum* Bangs of Middle America noted by other authors is attributable in part to overlooked sexual dimorphism and in part to the assumption that all Mexican specimens could be considered topotypical of *finitimum.* The population of the Río Papaloapan drainage of Veracruz and adjacent northern Oaxaca, at the northern extreme of the species' range, is distinct and is described as *T. c. viridiorsale* ssp. nov. The population of Panamá and most of adjacent Costa Rica is also separable and is named *T. c. wetmorei* ssp. nov. Trends in geographically correlated variation within *T. c. cinereum* (Linnaeus) of northern South America are outlined.

Acknowledgments

Specimens in Carnegie Museum of Natural History were supplemented by material generously loaned by the curators of the following institutions: American Museum of Natural History; Delaware Museum of Natural History (DMNH); Museum of Comparative Zoology, Harvard University; Museum of Zoology, University of Michigan (UMMZ); National Museum of Natural History (USNM); Peabody Museum of Natural History, Yale University. At the beginning of this study, specimens were examined at the Museum of Natural Science, Louisiana State University, but no list was made of these, and only one appears among the SPECIMENS EXAMINED (one of the two *viridiorsale* from Loma Bonita, Oaxaca). Similarly, specimens examined at the Academy of Natural Sciences of Philadelphia (ANSP) after the study was essentially finished do not appear in the SPECIMENS EXAMINED list, except for three specimens of *wetmorei.* I want to thank Dale A. Zimmerman for access to unpublished data, as well as Allan R. Phillips, Robert W. Dickerman, Juan Nava S., and Santos Farfán B. for companionship and help in the field in México. Dickerman also donated some specimens of this species to the CM collection. Permits to collect birds in México were obtained through the cooperation of the Departamento de Conservación de la Fauna Silvestre. My field work in México was supported by the Edward O'Neil Fund of Carnegie Museum of Natural History.

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STATUS OF THE NIGHT HERONS (*NYCTICORAX*) OF THE PHILIPPINES AND VICINITY

John P. Hubbard

Two species of *Nycticorax* occur in the Philippines, the Black-crowned Night Heron (*N. nycticorax*) and the Rufous Night Heron (*N. caledonicus*). DuPont (1971) regards the latter as a widespread breeding bird of these islands, whereas he implies that *N. nycticorax* is only a winter visitant from Asia–recorded on Luzon, Calayan, and Mindanao. These two closely related (Bock, 1956) herons are largely allopatric, with contact or overlap known only in the Celebes (White, 1973) and in Java (Hoogerwerf, 1966). In at least the latter area, interbreeding has been reported (Hoogerwerf, 1966). Recently, specimens have been received at the Delaware Museum of Natural History (DMNH) that indicate that *N. nycticorax* occurs in summer on Luzon with *N. caledonicus;* among the adult specimens taken, there is one that I regard as a probable hybrid between the two species. I propose to discuss this situation and related aspects, including an assessment of the two races of *N. caledonicus* that have been described from the Philippines; i.e., *N. c. manillensis* Vigors and *N. c. major* Hachisuka.

DESCRIPTION AND RANGES OF THE TWO SPECIES

The Black-crowned Night Heron and the Rufous Night Heron are basically similar in morphology and, as far as I can determine, habits. *N. n. nycticorax* is a familiar species in Eurasia and Africa, with the upperparts, underwings, cheeks, neck, sides, wings, and tail various shades of gray; the crown and back black; and the remaining underparts, forehead, superciliary, and nuptial plumes white. In *N. caledonicus,* the upperparts (including the back), neck, wings, and tail are rufous to brown. The underwings are rufous variously mixed with white, the crown and the forehead black, and the nuptial plumes white to blackish. The underparts are white, and (depending on the race) the superciliary, sides, and thighs are white to rufous, the latter being the color of these parts in Philippine birds.

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At present, *N. nycticorax* is known to breed in Asia southward to Java (Hoogerwerf, 1966, etc.) and Borneo (Smythies, 1960); in the summer of 1867 at least, it also occurred in the Celebes (White, 1973) and may have bred there. *N. caledonicus* occurs northward in the region to Luzon and apparently eastern Java (Hoogerwerf, 1966), as well as casually to Borneo (Smythies, 1960).

The assessment of the status of *N. nycticorax* is complicated by the fact that the species occurs southward as a migrant from eastern Eurasia, at least in the Philippines. For example, several birds banded in the breeding season in Japan have been recovered in winter or migration on Luzon (Austin and Kuroda, 1953; McClure, 1966, 1967). To date, there seem to be no Asian (Malaya, Taiwan, Japan) birds recovered in such areas as Borneo, Sumatra, or Java; and this may mean that under ordinary circumstances the migration touches only the Philippines. On the other hand, presumable migrants of this species have been taken in the Caroline Islands (Palau, Ponape—both USNM), which suggests that the species can be expected farther west and south as well. At any rate, the fact that migrants of *N. nycticorax* reach the northern part of the range of *N. caledonicus* means that caution must be used in any statements regarding sympatry between the two species.

RANGES AND STATUS OF THE SPECIES IN THE PHILIPPINES

N. caledonicus certainly occurs throughout the Philippines. I have seen specimens from Luzon, Marinduque, Mindoro, Negros, Panay, Siquijor, Palawan, Mindanao, and the Sulu Archipelago (Sibutu, Siassi, and Tawi Tawi Islands). In addition, there are various literature citations of specimens from Cebu, Dumiguete, Basilan, and Samar. In spite of the widespread distribution of the species, little precise information has been published on breeding. McGregor (1909) lists eggs from Siquijor in February and May, and I have seen young juveniles as follows: Siassi, November 1895 (ANSP); Siquijor, 26 February 1888 (USNM); and Palawan, March 1971 (DMNH).

I have examined *N. nycticorax* specimens only from Luzon, with dates from 22 January to 18 March and in June—the latter being the birds in the recent DMNH series (3 adults, 1 subadult, and 1 immature). McGregor (1904) took one or possibly two specimens on Calayan in the period September to November 1903, and in his most inclusive work on the birds of the Philippines (McGregor, 1909), he reported the species from Mindanao, Calayan, and Luzon. Sharpe (1898) also listed specimens in the British Museum from Luzon, but he gave no dates. Finally, Melvin Traylor (*in litt.*) has informed me of an immature from Mindanao (FMNH), taken on 17 October 1968.

The recent DMNH series of *Nycticorax* (both species) from the Philippines, taken in June 1973, consists of 12 specimens from Balian, Pangil, on Laguna Bay, in Laguna Province, Luzon. According to notes supplied by the collectors, that area is semiswampland, with mangrove-like trees and reeds interspersed with rice fields. Night herons were said to be breeding there in June 1973, with nests placed in the lower trees and containing an average of four light blue eggs. The implication is that both *N. nycticorax* and *N. caledonicus* were nesting at the site.

The size of the gonads (illustrated on the labels) in adult specimens would seem consistent with the information supplied by the collectors; the birds may have been in the incubation phase of breeding, as the gonads appear in regressed stage. The *N. nycticorax* gonads measure as follows: male, testes 3.5 X 7 mm; females (2), ovaries 9 X 2 and 7 X 2. The *N. caledonicus* measure: male, testes 6 X 11; females (3), ovaries 8 X 2.5, 8 X 2.5, and 9 X 2 mm. On the other hand, the putative hybrid had testes too large to illustrate on the label, and the measurements were written by the collector as 10 X 23 mm.

From the preceding evidence, I believe that both species of *Nycticorax* were indeed nesting when this series was taken. Certainly, migrant *N. nycticorax* from Asia should be absent from Luzon in June, judging from the dates of occurrence of the species in areas such as Japan (Austin and Kuroda, 1953). Furthermore, judging from the fact that the putative hybrid is an adult, I would assume that these two species of *Nycticorax* bred together at Balian not only in 1973, but probably for some years previously. According to Palmer (1962), the adult plumage of *N. nycticorax* is not attained until the age of three years, and this could also apply to *N. caledonicus*. Consequently, sympatry of the two species is judged to have occurred for at least several years, if not longer.

GEOGRAPHIC VARIATION OF *N. caledonicus* IN THE PHILIPPINES

The name *N. c. manillensis* Vigors has been applied generally to birds from throughout the Philippine Islands. However, Hachisuka (1926) introduced another name in describing *N. c. major* from Zamboanga, Mindanao. He distinguished his new race as being larger than *manillensis* and in having the base of the mandible pale, rather than black. In his series of 15 specimens, from unspecified Philippine localities, he stated that *major* exceeded *manillensis* by 24 mm in wing length, 9 mm in tail length, and 3 mm in tarsus length. The type of *major*, an adult male, was said to measure 336, 130, and 90 mm in these characters, plus 73 mm in bill length (presumably exposed culmen).

In my analysis of 42 adult and subadult (presumably two-year-old birds) specimens of *N. caledonicus* from the Philippines, I find that southern populations do average consistently larger than northern ones (Table 1). Eighteen specimens from Luzon, Marinduque, and Mindoro have the wings and tarsi of males and the tails and tarsi of females significantly shorter than those of 19 specimens from Mindanao and the Sulu Archipelago (Mann-Whitney U test, $P < .5$, H: $\bar{x}_1 = \bar{x}_2$). The remaining measurements are also generally smaller (not significantly so) in the northern population; however, in culmen length

Table 1: Measurements (in mm) of Adult and Subadult *Nycticorax* from the Philippines (*N. caledonicus* and Putative Hybrid) and the Philippines and vicinity[1] (*N. nycticorax*)

	Wing (arc)			Tail			Culmen[2]			Tarsus		
	N	*Mean*	*S.D.*	*N*	*Mean*	*S.D.*	*N*	*Mean*	*S.D.*	*N*	*Mean*	*S.D.*
Males												
N. c. major	12	329.7	11.6	10	110.5	5.2	10	74.0	3.4	10	88.0	4.1
N. c. manillensis	5	305.0	9.3	5	105.9	3.7	6	70.7	2.3	6	81.0	4.7
Hybrid	1	298.0	–	1	104.0	–	1	79.5	–	1	83.5	–
N. n. nycticorax	3	281.3	–	3	95.7	–	3	72.0	–	3	76.0	–
Females												
N. c. major	7	311.0	12.8	7	108.4	5.0	6	70.2	2.7	7	85.4	2.9
N. c. manillensis	10	299.3	7.4	8	100.6	2.2	9	70.9	1.6	9	81.9	1.5
N. c. nycticorax	7	280.7	9.5	6	92.3	7.1	6	69.2	3.7	6	73.0	1.8

[1] Specimens from Philippines, Java, and Borneo
[2] Exposed

of females, the means are similar in the two samples. Specimens from intervening areas are few, but four from Negros are generally long-winged: female 318; males 308, 330, 321 (female and first two males were measured by M Traylor); a male from Samar (wing 319) was measured by Rand and Rabor (1960). On the other hand, a single male from Panay is small (wing 307).

Based on my assessment of mensural data, I would accept *major* as a valid race and extend its range from the Sulu Archipelago and Mindanao northward to include Negros and probably Samar; *manillensis* includes the birds of Luzon, Mindoro, and probably Panay. In addition, I would assign two specimens from Labuan Island, North Borneo (AMNH) to *manillensis*: unsexed adult [♂?] with the short tarsus length of 77.5 mm (wing 312.0, tail 105.0, culmen 77.5 mm); immature ♂, also with the tarsus short, at 76.5 mm (wing 309.0, tail 102.5, culmen 69.5 mm). I have not seen grown specimens from Palawan, but judging from those of Borneo, *H. c. manillensis* may well be the race that occurs there.

While overlap exists between *manillensis* and *major*, in combination the measurements allow the proper identification of virtually all examined Philippine adult and subadult specimens to one race or the other. I suspect that in some cases birds have been mis-sexed, with the result that part of the mensural overlap is more apparent than real. Full-grown immatures (one year old or less) average somewhat smaller than adults and subadults, but in general they show parallel trends in variation to them; however, immatures may be more often mis-sexed than older birds, which would undermine their value in assessing geographic variation. In general, I find the following mensural distinctions apply to the two races (adults and subadults):

Males	
Wing 312 mm or less, tail 108 or less, tarsus 81.0 or less	*manillensis*
Wing 314 mm or more, tail 109 or more, tarsus 82.0 or more	*major*
Females	
Wing 310 mm or more, tail 102.5 or more, tarsus 83.5 or less	*manillensis*
Wing 303 mm or more, tail 102.5 or more, tarsus 84.0 or more	*major*

Regarding the supposed black (*manillensis*) versus pale base of the mandible (*major*)–said by Hachisuka (1926) to prevail in all populations of the species except those of the northern Philippines–I find this is indeed the trend, but much overlap exists. For example, in ten 1966 and 1971 adults of *major,* three have black and seven have light bases to the mandible; in five 1958 and 1972 *manillensis,* three have black and two have pale bases. The use of this character may be complicated by the age of a bird and the length of time a specimen has been in a collection. Thus, young *N. caledonicus* have more pale coloration in the bill than adults, and this possibly persists through the earliest assumption of adult plumage. Also, birds collected early in this century seem to have the base of the mandible black with a greater frequency than in more recently taken specimens. For example, four such *manillensis* specimens have the base of the mandible black, as do three *major*–including one subadult. From the above findings, I would regard bill color as a variable character and of no or very limited value in segregating these two races.

THE PUTATIVE HYBRID FROM LUZON

The Philippine specimen (DMNH 19404) that I regard as a hybrid between *N. nycticorax* and *N. caledonicus* was collected in June 1973 in Laguna Province, as already stated. The bird is in adult plumage and more closely resembles *caledonicus* than *nycticorax*. It differs from the former in several respects (Table 2), including having a pale forehead, browner (less rufous) upperparts, and whiter nuptial plumes and underparts, as well as having the rufous chest band broken medially by white. The increased white in the plumage is thought to be a reflection of *nycticorax* "genes," and the grays in that species' plumage (versus rufous in *caledonicus*) may also account for the brownness in the hybrid. In wing and tail measurements, the supposed hybrid is closer to *N. c. manillensis* than to the smaller *N. n. nycticorax* (Table 1). The hybrid also agrees more closely in exposed culmen and tarsus length with *N. caledonicus*, but it is larger in these characters than specimens of *manillensis* and instead overlaps with *major.* None of the Philippine specimens of *N. n. nycticorax* approaches the hybrid in size (or in other characters), nor is there an approach in the meas-

Table 2: Plumage Comparisons of Adult *Nycticorax nycticorax*, *N. caledonicus*, and a Putative Hybrid of the Two from the Philippines

Characters	*N. caledonicus*[1] (Philippines)	Putative hybrid (Luzon)	*N. nycticorax*[2] (Asia)
Nuptial plumes	brown to whitish	white with slight brown wash	white
Superciliary	light rufous to black	buff	white
Forehead (anterior)	black	grayish buff	white
Cheeks and auriculars	buff to light rufous	light grayish brown to buff	white to gray
Throat	white to buff	white	white
Nape	rufous, with dark brown to black tips	light brown	light gray
Chest			
sides	shades of rufous	light rufous	gray
middle	shades of rufous	white with light rufous tips	white
Sides	white to light rufous	white with slight rufous	gray
Thighs	light rufous	white with slight buff	white
Back	reddish brown, darkest and least reddish in upper area	light brown with grayish cast	bluish black with greenish iridescence
Wings and tail	rufous	light (beige) brown	gray
Axillars, underwing coverts	light rufous and white	white with slight buff	white and light gray

[1] *N. c. manillensis* and *N. c. major*
[2] *N. n. nycticorax*

urements published for this form from elsewhere (e.g., Witherby, 1947). In sum, the putative hybrid from Luzon agrees more closely with *N. caledonicus*, but in some respects of the plumage it shows the apparent influence of *N. nycticorax*.

From greater resemblance of the hybrid in size and plumage to *N. caledonicus*, I suspect that it may be a backcross rather than an F_1 of these two species.

In addition, the four adult *N. caledonicus* taken with the hybrid also show certain departures from specimens of the species taken elsewhere in the Philippines; i.e., they have somewhat more brownish upperparts and the nuptial plumes are white. I am uncertain as to the significance of these departures, but it is conceivable that they may reflect the presence of *N. nycticorax* genes in these birds. The three adult *N. nycticorax* collected with the hybrid appear typical of their species.

In view of the variability within *N. caledonicus* (Amadon, 1942), it is appropriate to consider the possibility that the supposed hybrid might be either a vagrant of another race of the species or possibly a mutant. In the first regard, I find that there is a certain similarity between the putative hybrid and specimens of *N. c. pelewensis* Mathews (Caroline Islands). That race is duller than *manillensis* and *major,* has the rufous breast band interrupted by white, and often has white nuptial plumes. However, my comparisons show that the supposed hybrid is even browner than *pelewensis*, with less rufous on the wings and tail, much darker and browner back, browner cheeks, brighter and more rufous breast, and whiter underwing surfaces. Also, the hybrid has a pale area on the forehead, a feature not seen in any other specimen except one Australian example of *N. c. hilli* (Mathews). I am convinced that the Luzon bird is not *N. c. pelewensis* nor any other race of the species, and I am unaware of any known mutant that resembles it.

HYBRIDIZATION ELSEWHERE BETWEEN THE TWO SPECIES

The other hybrids described between *N. nycticorax* and *N. caledonicus* are from western Java, where Hoogerwerf (1966) has reported occasional individuals of the latter species breeding among the abundant *N. nycticorax.* His description of an apparent subadult hybrid is based on a bird raised in captivity. Compared to an individual of *N. nycticorax* of about the same age, Hoogerwerf describes the presumed hybrid as having the wings duller bluish gray, washed with a reddish coloration that extends over the sides of the neck and breast; the back was said to be only a trifle darker than the wings, while the neck and crown were darker than in *N. caledonicus.* Hoogerwerf also collected an adult female *N. caledonicus* from the colony from which the presumed hybrid came. The specimen was compared by him to specimens of *N. c. hilli* and found to differ as follows: the white underparts were considerably less washed with buffy brown, especially on the cheeks, foreneck, and chest; there was a distinct white frontal area connected to the white superciliaries; and the mantle and scapulars were distinctly darker. The nuptial plumes were said to be white with dark tips, and the wings measured 264 and 269 mm.

Without having seen either of Hoogerwerf's specimens, it is difficult to judge them relative to the putative Philippine hybrid. However, the description of his subadult hybrid seems to place the bird closer to *N. nycticorax*, which might indicate that it is a backcross between that species and a more intermediate (e.g., F_1) hybrid.

The view of possible backcrossing is strengthened if one considers his specimens of *N. caledonicus* actually to be a hybrid; leading me to this view are such characteristics as the specimen's reduction in rufous below, darker upperparts, and the presence of a white frontal region. The specimen is also shorter winged than typical *N. c. hilli* (Amadon, 1942), the race one would expect in Java; on the other hand, the specimen agrees more with *N. nycticorax* in this character.

Hoogerwerf (1966) also describes an oddly plumaged adult male *N. caledonicus* from the Celebes, and I regard it, too, as a possible hybrid. He described that specimen as differing from *N. c. hilli* in having a partly gray tint to the primaries, back, and tail; in being paler on the remainder of the wings and lower mantle; and in having a light frontal area. The wing length of 286 mm is also small for *hilli* (Amadon, 1942). Hoogerwerf (1966) also raises the possibility that the two adult *N. caledonicus* that he describes are actually hybrids; however, he goes on to state that he does not believe them to be, as they do not closely resemble the subadult, known hybrid that he described. If backcrossing is a factor, however, it could produce a spectrum of hybrid types; thus, Hoogerwerf's two adults could indeed be hybrids as well. In fact, I suspect that backcrossing has indeed occurred, and hybridization between the two species may well be more widespread than previously thought, e.g., in Java, the Celebes, and Luzon.

A factor to be kept in mind in assessing the status of these two species, and one alluded to earlier, is the possibility that some of the oddly plumaged birds might represent color or pattern aberrancies. In the American race *N. n. hoactli* (Gmelin), van Rossem (1936) has reported an instance of erythrism in a subadult from California. This bird was normally plumaged, except that the mantle and wing coverts were brown (Hays Russet of Ridgway) instead of black, and the lateral underparts and sides of the chest were tinged with reddish rather than gray. I have seen two adult specimens (USNM), presumed *N. n. nycticorax,* from Enggano Island, off western Sumatra, that also show this type of coloration. One has grayish buff replacing the gray of the cheeks and nape, some buff on the wings and back, and the mantle dull, grayish black. The other is even more extreme, with buff instead of gray cheeks, nape, neck, sides of chest, sides, axillars, and underwings (mixed with white), and on the wings, tail, and rump; the mantle is dark, grayish brown, and the tail is pale and mottled from white to gray and brown. In size both specimens are close to *N. n. nycticorax*, and I agree with Ripley (1944) that they are best considered erythristic examples of this species. However, the possibility that some gene flow from *N. caledonicus* is involved in their ancestry cannot be absolutely ruled out, as Enggano Island is very close to western Java–where hybridization is know to occur. Interestingly, these two specimens led Ripley (1944) to speculate that *N. caledonicus* might be a species in which a mutation to erythrism has become dominant in the genotypes, presumably inferring that this species evolved from an *N. nycticorax*-like (i.e., grayish) ancestor.

SUMMARY

N. nycticorax and *N. caledonicus* are closely related species that have been sympatric at one time or another in Java, Celebes, and the Philippines. In each of these areas at least one instance of hybridization seems to have occurred, and backcrossing may have occurred as well. In Luzon, a series of specimens taken in 1973 and field notes of the collectors show both species occurring and probably breeding together in Laguna Province in June. One of 12 specimens appears to be a hybrid between the two species (closer to *N. caledonicus*), and the four adult *caledonicus* in the series are somewhat atypical for the species and could have *nycticorax* genes (the three specimens of the latter species appear typical). Finally, on mensural grounds I recognize the smaller race *H. c. manillensis* Vigors in the northern Philippines (vagrant [?] to Borneo) and the larger *H. c. major* Hachisuka in the south.

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THE NOMENCLATURAL HISTORY OF THE CRISSAL THRASHER (AVES: MIMIDAE)

John P. Hubbard

Seldom is the nomenclatural history of any given taxon worthy of extended discourse, but that of the Crissal Thrasher may well be an exception. This species, which has gone under both the names *Toxostoma crissale* and *Toxostoma dorsale,* provides an extreme example of how the Rule of Priority may function—or, to critics, disfunction. The crux of the matter is that a name published by mistake (i.e., *dorsale*) has legal priority and must be used according to the rules of the International Code of Zoological Nomenclature (Stoll et al., 1961), this in spite of the fact that the name was unintended, inappropriate, and promptly corrected (i.e., to *crissale*) by the describer. My aim in this paper is to detail the events surrounding the original description of this thrasher, in order to place the matter on the record and to examine the functioning of the Rule of Priority in particular and the Code in general.

The principals in this case are the Crissal Thrasher and three men. The thrasher resides in the southwestern United States and Mexico, and its legal name is currently *Toxostoma dorsale.* The men were: Thomas Charlton Henry, U. S. Army surgeon who collected the type of thrasher in New Mexico in the 1850s; Spencer Fullerton Baird, ornithologist at the Smithsonian Institution and the person who actually described the Crissal Thrasher (but in Henry's name; i.e., Henry, 1858); and John Cassin, ornithologist at the Academy of Natural Sciences of Philadelphia (ANSP) and the man to whom Henry originally sent the thrasher specimen and through whom Baird's description was submitted for publication in the Proceedings of the ANSP.

According to the Rule of Priority, the first name legally published is the one that applies to the taxon, with certain exceptions. Among these exceptions is the instance in which an erroneously published name may be corrected, such as when the error is the result of a lapsus calami or a printer's mistake (Articles 19 and 32 of the Code). However, such corrections can be made only in *spelling*; and, according to Article 32(a)(ii), any mistake in the published name

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must be clearly evident in the original publication. Furthermore, as amended at the 1972 International Congress of Zoology (Minutes of XVIIth Congress, Bull. Zool. Nomencl. 29, pt. 4:178, 188), even for correction of a spelling error, justification must be done "without recourse to any external source of information."

As intimated above, what is involved in the matter of the proper name of the Crissal Thrasher is the choice between two entirely different words, i.e., *dorsale* versus *crissale,* not a correction of a spelling error. Clearly, under the Code there is no provision for replacement of one word by another, regardless of whether or not a mistake is involved. Thus, *dorsale* is in an unassailable position as the first legally published name; and, in spite of the fact that *crissale* was the intended name, the former must be used under the Code.

Oberholser (1920) was the first to point out the legal claim for *dorsale* as the epithet for the thrasher, after *crissale* had been used universally for over 60 years. A decade later Oberholser (1930) reiterated this claim, and beginning in 1931 the American Ornithologists' Union adopted *dorsale* in the Check-list of North American Birds. Thus the current tenure of *dorsale* as the official name for the Crissal Thrasher began almost three quarters of a century after the specimen was described to science, or some 45 years ago. At this point let us return to the 1850s and pick up the threads leading to the description of the Crissal Thrasher, in order that we might better understand and interpret subsequent events.

The type of *Toxostoma dorsale* was originally cataloged (as number 8127 in November 1857) and apparently labeled at the Smithsonian Institution, with the data *"Toxostoma henryi,* Mimbres to Rio Grande Dr. T. C. Henry." The label also bore "L 32" (latitude) after the locality and "U.S.A." (U. S. Army) after the collector. At some later date(s) *"henryi"* was changed to *"chrysalis"* and then *"crissalis,"* and the following annotation was made: "Type: sent to Acad. Nat. Sci. Phila." The specimen is now at the Academy of Natural Sciences of Philadelphia (no. 23,713), but I could not determine the date of this transfer. From the above, it appears, among other things, that someone at the Smithsonian–almost certainly Spencer F. Baird–had at one time planned to name the new thrasher after Dr. Henry; this plan was later abandoned for reasons that will emerge below.

We know from various sources, including the specimens themselves, that Dr. Henry collected birds in New Mexico. From letters exchanged between John Cassin and Baird, we know that Henry sent specimens to Cassin, who regarded Henry as a protege, and thence to Baird (Smithsonian Archives, Spencer F. Baird Papers, Incoming Personal Correspondence [I.P.C.]) and Letters Written by S. F. Baird [L.W.B.]). For example, in April 1855, Cassin and Baird exchanged letters (I.P.C., vol. 9, nos. 240, 241, 245; L.W.B., vol. 11, no. 137) regarding certain of Henry's specimens that Cassin wished to borrow to verify identifications cited in a paper that was to be published later that year (i.e., Henry, 1855). While the specimen of the thrasher was not among those queried by Cassin, it undoubtedly had been collected and probably shipped by then to Baird. In his paper, Henry (1855:308) cites what must have been this species as *"Toxostoma redivida"* (i.e., the California Thrasher) and indicates that it was rather abundant at Ft. Fillmore and was also seen at Ft. Thorn; both of these sites are in the present Dona Aña County, New Mexico.

Precisely when Henry collected the type specimen of the thrasher is unknown, and we do not really know for certain whether the site was Ft. Fillmore or Ft. Thorn. From various sources (Bailey, 1928; Hume, 1942; Henry, 1855), we know that Henry was at the former place from August into December 1852 and at the latter from about December 1853 to 1858. Ft. Fillmore is about 40 air miles south-southeast of Ft. Thorn, close enough so that which of the two is accepted as the type locality is not a matter of concern. Ft. Thorn has come to be known as the type locality, apparently because of its mention in the original description; however, no such locality appears in the catalog or on the label (in fact, this and perhaps all others of Henry's specimens were apparently received without data). Furthermore, as Henry appears to have had nothing to do with describing the species (as will be brought out later in this paper), Ft. Thorn appears to have been arbitrarily selected from his published account (Henry, 1855) as the type locality.

From what has been detailed to this point, we can assume that Henry collected the type of *Toxostoma dorsale* at either Ft. Fillmore or Ft. Thorn and that he sent it via Cassin to the Smithsonian; there it remained from at least April 1855 to at least November 1857. At what point Cassin or Baird became aware that the bird represented a new species is problematical, but in a letter to Baird dated 6 May 1856 (I.P.C., vol. 9, no. 292), Cassin stated that more specimens were on the way from Henry and that the latter "...wishes his collection retained for his own examination, intending to describe the new species himself!" Whether Henry knew about and was referring to the new thrasher or not, one cannot say; however, one might assume that he was, as the apparent plan to call the bird *Toxostoma henryi* (a name already on the label and in the catalog) was dropped.

For the next two years the matter of the thrasher does not surface in the Cassin-Baird correspondence; but on 9 May 1858, with the publication of Baird's (1858) work on North American birds on the horizon, Baird wrote Cassin the following (L.W.B., vol. 17, no. 368):

"I send descriptions of new birds by [John Xantus de] Vesey and [T. Charlton] Henry which please have published in the May Proceedings of the Academy. I quote them [in my work as being] from the May number."

Description of a New *Toxostoma* from Near Fort Thorn, New Mexico by Dr. T. Charlton Henry, U. S. Army

Toxostoma crissalis Henry. Second quills about as long as the secondaries. Bill much curved and longer than the head. Colo [strik-

> en] above olive brown with a faint shade of gray, beneath nearly uniform brownish gray much paler than the back, passing insensibly into white on the chin, but the under tail coverts dark brownish rufous and abruptly defined. There is a black maxillary stripe, cutting off a white one above it, but there does not appear to be any other stripes about the head. There are no bands in the wings, and the tips and outer edges of the tail feathers are only [striken] very inconspicuously lighter than the remaining portions. Length 11 inches, wing 4.00 inches and tail 5¾, tarsus 1.25.

From the preceding it is clear that Baird rather than Henry actually described *Toxostoma dorsale* and that in the original manuscript the name was given as *crissalis*. In a letter dated 11 May 1858 (I.P.C., vol. 9, no. 349), Cassin acknowledged receipt of the papers by "Vesey" and "Henry" and indicated that they would be read that night at the Academy in Philadelphia. On 25 May 1858, "Henry's" paper was accepted for publication in the Proceedings (Archives of the ANSP, minutes of the publication committee for papers given in the Hall of the Academy of Natural Sciences), but the indications are that the paper was not read until 18 May 1858—a week after Cassin expected.

That the description of the new thrasher was badly handled in the published ANSP Proceedings is apparent, but part of the problem may have stemmed from Baird himself. As we have seen, he initially sent a description of the new *Toxostoma* to Philadelphia on 9 May 1858. Sometime between that date and the appearance of the Proceedings (early June 1858), Baird also sent—again in Henry's name—the description of a new junco, i.e., *Junco dorsalis*. Although I can find no prepublication reference to the second description in the Baird-Cassin correspondence, it would seem that Baird decided it should be included with the description of the *Toxostoma*. Precisely who (Leconte?—see below) was supposed to combine the two manuscripts and whether the second was read, I cannot ascertain. At any rate, the two were combined, but with disastrous results. In the first place, the title of the published paper was kept as "Description of a new *Toxostoma* from Fort Thorn, New Mexico," even with the inclusion of the new *Junco*. In addition, there were several other errors or inconsistencies, including *Fringilla* being written as *Tringilla,* and of course the replacement of *crissalis* by *dorsalis* as the species epithet with *Toxostoma*. Obviously, the latter occurred when the two descriptions were combined, and it resulted from association with *Junco dorsalis* (the latter suffered in having its type locality given as Fort Thorn, but later Henry [1859:107] specifically stated that he found the bird only at Fort Stanton, New Mexico).

Baird was understandably irritated when he saw the mistakes in the published paper, and on 14 June 1858 he wrote Cassin as follows (L.W.B., vol. 17, no. 448):

"The printers have made sad work out of the description I sent. The Toxostoma [not underlined] *crissalis* is printed *dorsalis*. *Fringilla* is *Tringilla*. Tertials at the end of the account of *Junco dorsalis* is written rostrals. Why did you not look over this or have proof sent to me.

"Can you have the enclosed corrections made in the next number. It would not make so much difference about Toxostoma [not underlined] if I had not already printed it *crissalis* in my report. Don't let my name appear in the rectification [next word illegible] as I do not want it to appear that it's not from Henry. I am very sorry for this absurd mess. Next time I shall ask for proof.

"[Correction] of certain errors in the articles by Henry, U.S.A., printed on page 117. The paper should be titled 'Description of new species of birds from Fort Thorn, New Mexico' instead of 'Description of a new *Toxostoma.* The second species was added after the title was made up for the description of [crossed out] the first alone.

"The name of the *Toxostoma* should be *crissalis* [written and crossed out] *crissalis* [printed], as written in the mss, not *dorsalis*. On page 118 read *Fringilla* instead of *Tringilla* and for rostrals at the end of the article read tertials.

"Proof of this to be sent to S.F. Baird, Washington, or John Cassin."

Cassin's response (I.P.C., vol. 9, no. 352) to Baird, dated 16 June 1858, was: "Very disagreeable business, that about Henry's birds–I had nothing to do with it–and have never yet seen it in print, in fact did not know that the No. was out until you wrote,–both papers were clearly legibly written and I handed them to *the* member of the pub. comm. [publication committee] who has officiated as a sort of editor...."

On 23 June 1858, Cassin wrote Baird (I.P.C., vol. 9, no. 353): "About that paper of Henry's I stirred up Dr. Leconte into such an entirely efficient sense of propriety that he insisted on the printer doing the paper over again, to be circulated with the next No.–so it stands at present–this time I will see proofs–Sir, the distinguished individual above mentioned and previously alluded to (Dr. John Leconte), stood some about the title, but it is arranged to read 'Descriptions of a new *Toxostoma* and a new *Junco* etc.' which will be right enough."

And so it came to pass that "Henry's" paper was reissued (as "Descriptions of new birds from Fort Thorn, New Mexico"), with the correction made to *Toxostoma crissalis* and other changes. At the end of the 1858 volume of the Proceedings, the directions to the binder are to cancel pages 117 and 118 as issued in the April-May number and to replace them with the new pages issued in June. With that change, *Toxostoma dorsalis* disappears from usage in ornithology until Oberholser (1920) resurrected it; the name was subsequently altered to agree with the neuter gender of the genus (Brown, 1954; contra Oberholser 1920, 1930).

The acceptance of the legality of the name *Toxostoma dorsale* in recent decades has been nearly universal, but this is not entirely the case. Phillips (1962:346) and Phillips et al. (1964:125) strongly rejected *dorsale*, saying to the effect that to accept it is to allow "printer's devils" instead of scientists to establish nomenclature. Other authors have expressed similar opinions over other such instances, and Delacour and Mayr (1945:5) eloquently rejected any simplistic and absolute application of the Rule of Priority to cases of this type.

In assessing this particular case, it seems to me that the application of the Rule of Priority in overturning *crissale* for *dorsale* is an unnecessary sacrifice to be made in the pursuit of nomenclatural stability. Logic rather than dictum seems called for here, and I submit that a meaningful Code should allow for justifiable changes. For example, Article 32 of the 1961 Code could be amended by a simple paragraph as follows:

> **(d)** Incorrect original name—If a name (subspecies, species, genus) in the original publication can be demonstrated to have been incorrect, i.e., other than that intended by the author, it may be substituted for by the corrected name by that author or other appropriate authority. The overriding factor is that the intended name must have been subverted by a misprint, typographical error, lapsus calami, or similar event. This rule does not permit emendations of names that were published intentionally, and a strong case for changes must be made to show that the author's intent was indeed not honored. Evidence from the original publication and all other relevant sources may be used in this determination.
>
> **Example**—The name *Toxostoma dorsalis* (emended to *dorsale*) was originally published, but the author's intended name was *Toxostoma crissalis* (emended to *crissale*) as indicated by such evidence as a draft of the original manuscript, correspondence, and the reissue of the page with the name corrected to *Toxostoma crissalis.*

Should some form of legal correction be added to the Code, it could help guarantee that scientists rather than "printer's devils" establish nomenclature. Resultant corrections could still be confirmed by the governing body for zoological nomenclature, which now seems to lack sufficient guidelines to cover objectively such cases as *crissale* versus *dorsale*. Certainly nomenclature would stand to benefit by adopting a rule to assure a greater degree of objectivity, for the present tribunal approach to the problem is less than satisfactory.

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